VI. Strategies

The technology strategies developed during the strategic planning process cover a wide territory. Strategies have been developed in four major functional areas: service delivery, operations, architecture, and management and organization. The strategies were first introduced in the Executive Summary embedded within the guiding principles. The strategies are discussed below in terms of timing and then in detail in the following sections by functional areas.

The planned transition of the County's technology is being structured into three phases.

Phase One: "First things first," with the goal of establishing a proper management and technology foundation for subsequent growth, enhancement, and implementation processes.

Phase Two: "Beginning the march," with the goal of deploying new enterprise and e-government applications. In addition, this phase addresses needs for critical new infrastructure prioritized in terms of the value to be delivered to end-user communities.

Phase Three: "Long-term initiatives," with the goal of successfully deploying major and complex technologies that will move the County forward with the digital age. This phase will initiate as work is underway for Phases One and Two, but will progress in an incremental and phased manner to avoid the pitfalls of hasty and poorly planned implementation that has plagued government in the past.

The timing of strategy implementation is important. Some strategies are considered dependent on others, and should not be implemented until prior work has been completed. For example, implementation of the Internet, intranet, and extranet; hardware consolidation; Law, Safety, and Justice; and commercial packaged software strategies are all dependent on defining standards for such technologies during Phase One. The three phases are depicted in Table 24 below along with timing and a definition of outcomes for each phase.

Table 24: Strategy Phasing

Phase/Strategy	Year 1	Year 2	Year 3	Year 4 (and beyond if relevant)
Phase One – First things First				
A1. Utilize service-level agreements as a standard way of doing business.	■	■	→	→
A3. Utilize the State of Washington's Digital Academy to promote learning.	■	→	→	→
B1. Establish a comprehensive asset management function.	■	■	→	→
B2. Develop standard operating procedures to guide all agencies' technology staff.	■	■	→	→
B3. Strengthen system security.	■	■	→	→
B4. Strengthen business continuity capabilities.	■	■	→	→
C1. Standardize technology including infrastructure, hardware, and applications software.	■			
C2. Standardize Web-based technology used on the intranet, Internet, and extranet.	■	→	→	→
C3. Standardize County technical approach for application integration.	■			
C4. Purchase and integrate top quality, commercially packaged software where possible and cost effective.	■	■	→	→
C7. Institute Countywide best practices for enterprise data management.	■			

Phase/Strategy		Year 1	2	3	4 (and beyond if relevant)
D1.	Institutionalize performance measurement for technology.				
D2.	Develop technology design/plans for significant initiatives and projects.				
D3.	Establish a comprehensive project management methodology.				
D5.	Strengthen technology management and delivery capabilities through specialized training.				
PHASE ONE OUTCOMES – ESTABLISHED TECHNOLOGY MANAGEMENT FOUNDATION					
• Implemented service level agreements • Knowledge gained at the State's Digital Academy • More secure network • Formalized asset management • Developed SOPs • Developed plans addressing business continuity • Defined standards • Cost/Benefit analysis and decisions related to data management and approach to integration • Agreements and methodology to acquire and implement packaged software • Established use of performance measurement • Technology designs and plans developed • Defined project management methodologies •					
Phase Two – Beginning the March					
A2.	Reorganize the help desk function around a more centralized, streamlined, and coordinated model.				
A4.	Use the Internet as a primary mechanism to deliver public information and services.				
A5.	Promote and support the development of the employee intranet and partner extranet to improve information services and business process support.				
C5.	Consolidate hardware around the County.				
PHASE TWO OUTCOMES – ENHANCED HIGH PRIORITY SYSTEMS AND FUNCTIONS					
• Reorganized centralized help desk function • Increased use of the Internet, intranet, and extranet • Consolidated hardware • Strengthened technology personnel capabilities •					
Phase Three – Long-Term Initiatives					
C6	Use broadband technology and a fully integrated PBX architecture as the future centerpiece to converge data, voice, and video transport.				
C8.	Design and implement a common architecture to integrate workflow between Law, Safety, and Justice agencies.				
C9.	Implement a standardized integrated portfolio of enterprise Financial and HR/Payroll applications.				
D4.	Reorganize technology functions around the County.				
PHASE THREE OUTCOMES – IMPLEMENTED LONG-TERM TECHNOLOGIES					
• Implemented enterprise HR/Payroll and Financial applications • Integrating Law, Safety, and Justice agencies' workflow • Use of broadband to converge technologies together and new PBX design and systems • Reorganized functions •					
END STATE – 21ST CENTURY ORGANIZATION SUPPORTED BY INTEGRATED, STATE-OF-THE-ART, WEB-BASED SYSTEMS					
• Increased accountability • Trained personnel • Strengthened technology leadership • Integrated business processes within and between agencies • Formalized approach to technology management • Increased use of the Web to deliver information, services, and as a means to conduct business • functioning enterprise systems linking the County together • Converged voice, data, and video business functions •					

Legend:

Planning (if relevant)	Implementation	Ongoing (if relevant)

The first phase, "first things first," is set to establish a proper foundation from which to build and deploy new technologies. This is a phase in which important preparation activities will occur in order to properly position the County prior to implementing major new systems. This phase includes establishing standards and using them for effective planning and design. The standards established in Phase One will address infrastructure, hardware, applications software, Web-based technologies, data management, and the approach to application integration. Additionally, where relevant, standards will also be established to guide operations and maintenance activities. Many of these standards may be documented in the form of standard operating procedures (SOPs). Additional Phase One strategies include establishing service-level agreements, strengthening business continuity planning and security, establishing an asset management program, utilizing the State's digital academy, institutionalizing performance measurement, strengthening management and delivery capabilities, and enhancing project-management capabilities.

The second phase relates to building and implementing high-priority systems. This phase marks the "beginning of the march" toward deploying new enterprise systems as well as other needed infrastructure including e-government applications. During this period, Internet utilization is expected to expand, providing increased information access and services to the public, business partners, governments, and employees. The employee intranet and partner extranet will also see development to improve services and business process support. Specific strategies targeted for implementation include the reorganized help desk and consolidated hardware. The strategies targeted for the second phase are a high priority for the County. Phase Two prioritization is tied to the potential for high payback, relative ease of implementation, addressing problems that require resolution, and the next steps regarding technology implementation.

The third phase of the transition plan focuses on longer-term initiatives. This group of strategies is more complex and therefore is anticipated to require years of elapsed time to implement. This phase includes using broadband to achieve convergence; integrating workflow between Law, Safety, and Justice agencies; full utilization of HR/Payroll and Financial systems; and reorganizing technology functions around the County.

The three phases described above are interrelated. Thus, once the first phase activities of standards setting, planning, design, and decision making are well underway, Phase Two activities will begin. Phase Three work may also commence before Phases One and Two are fully complete, but because of the complexity and evolving nature of the subject area, the strategies are planned for implementation over an extended period. The overall phasing recognizes that the County is not positioned to conduct all of this work simultaneously because of resource constraints. The phasing is intended to balance workloads, expenditures, and the capacity to manage technology deployment.

Strategy Organization

The strategies described in the remainder of this document are defined to establish a new technology direction for the County. These strategies are designed to address (1) established business goals, (2) defined needs, and (3) the gap between such goals/needs and existing conditions within the County. The strategies define directions that will have a major impact on the County in terms of service delivery and resource allocation. Strategies were defined by comparing needs, goals, and objectives against the current technology environment, reviewing the gap between them, and then by assessing overall deficiencies. Based upon the gap of the issues identified in the study process, the most significant problems triggered development of specific strategies as defined herein.

Each strategy discussed is comprised of five components. First is the strategy *recommendation*. The recommendation is a statement of direction for the County to follow. Second is a *discussion* of what the strategy means. Third is a table with *summary indicators* related to timing and of how difficult it will be to implement the strategy. Indicators summarize difficulty as "High," "Moderate," or "Low." Fourth is a *business case*, which is a group of arguments that support going forward with the recommended strategy. The business case includes numerous items including summary discussion with cost/benefit elements where relevant; notation of related technology needs, business goals/objectives, and deficiencies met by the strategy; and cost and payback factors noting whether the strategy has high, moderate, or low cost, and payback. Business Goals and Objectives are detailed in Section II of the Appendix. Technology needs are likewise detailed in the Needs Summary located in Section III of the Appendix. Deficiencies are defined within the Technology Environment section of this report. Fifth, the strategy definition concludes with three additional items grouped together, including an *action plan* (in the form of a Gantt chart), *three-year summary cost table* with order of magnitude costs, and a bulleted list of *performance measures* under a category called "outcome measurement."

The defined costs supporting the strategies are stated at an order of magnitude level only. The costs have been defined at the highest level of planning and are considered conceptual from a planning standpoint. Costs have not been defined at an implementation planning level. Further, costs are incremental in nature, adding core technology capabilities to that which exists today. Costs must be verified and analyzed at a more specific level based upon detailed requirements definitions. The costs should be considered as rough estimates to be used for comparative planning purposes. As such, future verification should include analysis prior to going forward with strategy implementation. Costs have been derived through a combination of sources including past studies, preliminary research, planned costs already estimated within the agencies, and, in some cases, vendor input. Cost detail and assumptions for each strategy are listed in the plan appendix. Given the preliminary nature of these estimates, Moss Adams does not guarantee that these costs will synchronize with detailed requirements yet to be defined by the County. As detailed project plans are put into place, costs are expected to be refined, especially as related to County's staff time required during implementation. During detailed cost planning, all significant projects should proceed through the County's project approval process to confirm project feasibility and determined available funding sources.

A. Service Delivery

Five service-delivery strategies have been developed. Subject areas are the following: service-level agreements, help desk organization, using the State's Digital Academy, expanding the use of the Internet for the public, and promoting and supporting the employee intranet and partner extranet. Related to service delivery, strategy development weaknesses of particular concern include the lack of the following:

- Formal agreements between service providers and customers, in which performance commitments and expectations are set and documented in the form of service-level agreements.
- Coordination between the various help desk functions that are located around the County.
- Knowledge about Web technologies and the resulting impact on system development and deployment.
- Progress related to deployment of specific applications on the Internet providing public information and services.
- Migration of the County's technology embracing the employee intranet and partner extranet.

A1. Utilize service-level agreements as a standard way of doing business.

Timing: PHASE ONE	Difficulty: LOW
– Time is needed to establish agreements. – Will require analysis to determine appropriate level of service and compensation. – Some negotiation will be required to define mutual commitments.	

Service-level agreements (SLAs) are contracts between technology service providers and their customers. The focus of these agreements is to make commitments under which service providers will perform. These agreements are typically straightforward and designed to provide a degree of certainty to the customer related to resource availability and types of services to be provided. In return, service providers obtain a commitment by the customer to pay for the level of services agreed to, thus making it easier to plan and provide for resource deployment (e.g., skills, number of staff, up-to-date hardware, etc.).

The approach to developing service-level agreements within the County will entail establishing a framework from which different types of services may be defined along with the performance parameters that will apply. While particular agreements may differ for such areas as the help desk and network support, the same general framework may be used to establish the agreements. Agreements may then be used to gauge service and guide the parties' actions. The agreements may also be renewed regularly and apply to intra-County service providers and external vendors alike.

BUSINESS CASE

The benefits for the County of conducting business against the backdrop of service-level agreements are tied to clarity of the business relationship between the provider and the customer (i.e., in this case agency end-users). Service-level agreements provide a clear definition of what services are to be provided and what compensation will be paid in return. Agreements set clear expectations between the parties and will often improve customer relationships as a result. One of the most important benefits achieved is that the service provider can properly plan for allocation of certain levels of resource. This defined set of circumstances will optimize resource allocation for the provider and maximize productivity for the customer.

The costs required to define, implement, and maintain service-level agreements include the efforts to define and test benchmarks, develop agreements, and manage the agreements once they are in place. The time involved may add up but will be spread across those responsible for managing and delivering particular types of technology. For example, those managers responsible for training, support, help desk, and operations functions may lead the efforts to define, negotiate, and establish the agreements. Likewise, customer representatives are required to negotiate and track their side of the agreement(s).

Often organizations use service-level agreements because of a major change management wants to initiate. A regional example is the Grant County PUD, which in the late 1990s used service-level agreements to change the way service was delivered. The PUD used the negotiation process around establishing service-level agreements to reset expectations, optimize resource allocation, and eventually reduce the number of staff employed. Partially through the use of service-level agreements, the PUD successfully changed its business model and began servicing the organization with fewer staff.

Nationally, service-level agreements are becoming a standard way of documenting services to be delivered, along with performance expectations. An article in the 1998 issue of *CIO* magazine supports the utilization of such agreements, stating that "SLAs have evolved to a new level in the last few years, becoming more broad-reaching and bilateral." While they are not universal, agreements and knowledge of how to implement them are becoming a larger part of standard practice.

Related Technology Needs:	**Related Business Goals/Objectives/ Directions/Opportunities:**	**Related Deficiencies:**
• Proactive Service Delivery • Service-Level Commitments	• Improve/Expand Services • Establish Communication and Collaboration • Define Metrics and Performance Measures • Integrate and Establish Partnerships	• Few service-level agreements exist across the County. • Those that are in place are not actively managed. • ITS services have not always been available on a timely basis.

Costs:			Payback:		
Low	Moderate	High	Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Identify technologies requiring SLAs												
2. Assign responsibilities to develop												
3. Define customer requirements												
4. Assess current services												
5. Align with expected service levels												
6. Analyze costs												
7. Negotiate terms												
8. Develop SLAs												
9. Execute agreements												
10. Adjust provider resource mix (as required)												

Costs	Year 1	Year 2	Year 3
Capital:	200,000	100,000	
Operations:			
Total:	200,000	100,000	

Capital Costs: Years 1 and 2.
Operations Costs: Absorbed internally thereafter.

OUTCOME MEASUREMENT

- Service performance in alignment with customer expectations (as surveyed)
- Number of service-level agreements developed and actively maintained
- Problem resolution time

A2. Reorganize the help desk function around a more centralized, streamlined, and coordinated model.

Timing: PHASE TWO	Difficulty: LOW-MODERATE

– Must find new resources to staff the function.
– Expanded skill sets will be needed to be able to respond to requests for help.
– Expanded coordination between help desk and other personnel will be required.
– Automated systems should be in place to track activity.
– New processes and procedures require definition, and then must be communicated to end-users.

Two main points requiring attention in this area are to (1) provide a central point of contact for all users, and (2) coordinate service delivery among the dozens of technicians dispersed throughout the County. The benefits of reorganization will be to increase service delivery by providing resources in areas where they have been limited in the past, and strengthen coordination between service providers, thus becoming more efficient in terms of resource sharing and responding to requests for assistance. This greater efficiency could result in a decreased cost of per-incident support.

The centralized help desk will be positioned to handle incoming calls and e-mails from all agencies. Some of these calls must be queued through a central service provider because this will be the only source of assistance available. These calls will include requests for help regarding enterprise functions (such as messaging) and also for those functions that are not readily supported by other agencies (such as report development). It should be recognized that some types of calls may be better resolved through resources other than the central help desk. Prime examples include minor software, desktop, or LAN support calls. While these types of calls will flow through a central point of contact, many of the calls will be quickly sent to local service technicians for resolution. Regardless of where service comes from, all calls will be recorded, tracked, and coordinated until the issue is resolved.

The reorganized help desk will reengineer how requests are handled and also the corresponding assignment of resources to address such requests. The components of this reorganization include the following:

a) *Customer Reporting Mechanism*

Customers require a mechanism to communicate needs, issues, and problems to help desk personnel. Customers will communicate via three ways: e-mail, telephone including voice mail, and help desk–reporting software.

b) *Technology Interface*

Once requests are sent, the help desk personnel will receive, record, and track information for follow-up purposes. If possible, requests for assistance will be handled on the spot. Otherwise requests will be assigned to another resource for resolution. An automated issue/problem tracking system will record, track, and prioritize issues along with assignments of resources. In the future it is possible that automated e-mail updates will be sent to the user as the process of resolution commences.

c) *Service Coordination*

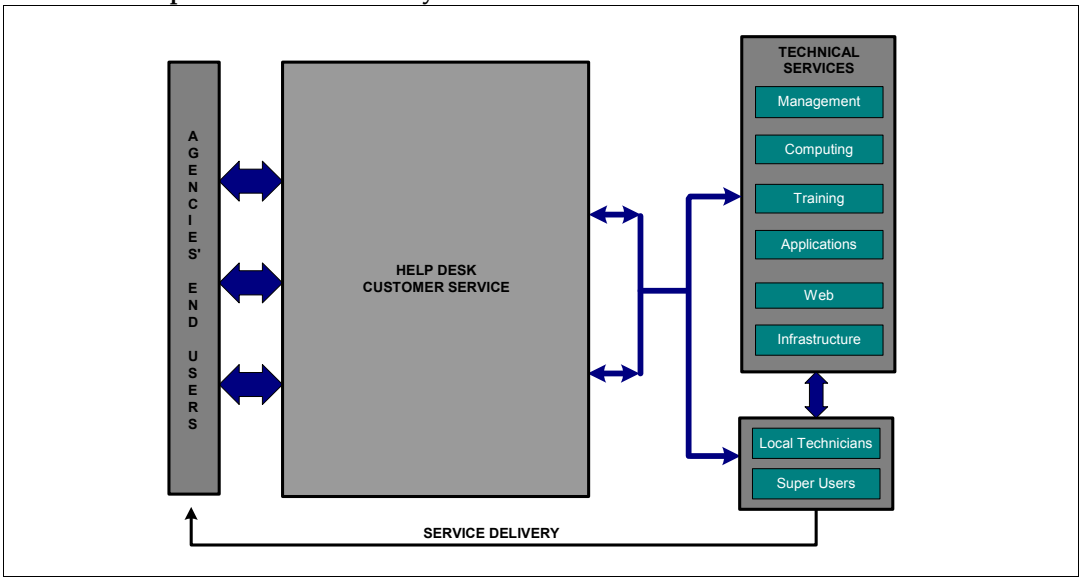
Customers will have a wide variety of requests, ranging from fixing a problem with a software program to asking for one-on-one support. These requests will be handled either immediately by the help desk or sent to an appropriate resource for follow-up and resolution.

d) *Service Delivery*

Once requests are directed to a service group, they will be prioritized for resolution. Resources will be assigned based upon the scope of the project, timing, and complexity of the assignment. Service delivery will be provided through the various groups assigned to assist end-user customers. The anticipated sources of help include the management, computing, training, applications, Web, and infrastructure groups within central services. Additional help may also be sought from local network administrators and super-users located within the agencies.

The centralized help desk function is depicted in Exhibit 11.

Exhibit 11: Help Desk Service Delivery Model



BUSINESS CASE

Many large organizations, including private industry, government, and nonprofit entities, have transitioned to centralized help desks in an effort to provide more efficient and cost-effective support. For example, the American Cancer Society worked to strategize, design, and roll out a solution for managing the organization's help desk and to streamline support procedures. According to Debbie Phillips, principal at The North Highland Co., the management and technology-consulting firm that assisted the American Cancer Society, "the project had to be viewed as evolutionary with a commitment to spend at least three to six months planning, building and implementing the strategy. Return on investment was realized six months into the process." [2]

Available industry statistics back the establishment and use of a centralized help desk function. According to Jeff Rumburg, Vice President of Meta Group:

- Calls resolved from the help desk, rather than at the user's desk, can reduce per-call costs by as much as 80 percent.
- Based on an organization with 3,000 employees and an average call volume of 5,000 calls per month, a decentralized help desk averaged $30 per call for a total of $150,000 per month. The same number of calls handled through a centralized help desk averaged $24 per call for a total of $120,000 per month, which is a noticeable difference.

[2] Christy Walker, "The American Cancer Society Finds an IT Cure," Smart Reseller Magazine 2, no. 123 (October 11, 1999): 46.

The net benefits of establishing more centralized support, significantly done through the help desk, are anticipated to be positive. The cost/benefit analysis is a classic example of a case in which concentrated resources are expended to address thousands of support requests that eventually add up to significant aggregated benefits throughout the enterprise. However, with significantly increased customer service provided by the help desk, end-users will indeed operate more efficiently. The specific benefits of the reorganized help desk are numerous; responsiveness will increase, proper customer expectations will be set, needs will be prioritized and, ultimately, resources will be better utilized.

The costs involved in establishing a central help desk function are associated with staffing, procedures definition, communication, and infrastructure. Centralized systems will also be needed. It is not known at this time whether existing help desk systems operated within the County will be able to support the County far into the future. The plan behind a central help desk is to reorganize existing resources (particularly staffing). In addition to existing personnel, several new full-time equivalents (FTEs) may be needed. Management will come from existing resources.

Related Technology Needs:	**Related Business Goals/Objectives/ Directions/Opportunities:**	**Related Deficiencies:**
• Proactive Service Delivery • Service-Level Commitments • Help Desk Support • Agency Coordination	• Improve/Expand Services • Empower Employees • Improve Processes • Establish Communication and Collaboration • Define Metrics and Performance Measures	• There is limited reporting available to track and measure performance. • Help desk boundaries and responsibilities are loosely defined across the County. • The customization that has been done to HEAT impairs some functionality and impacts the upgrade process. • Because agencies have evolved independently, there is some overlap in services being provided.

Costs:			**Payback:**		
Low	**Moderate**	**High**	**Low**	**Moderate**	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Review existing County help desk platform(s)												
2. Determine capabilities												
3. Develop implementation plan												
4. Acquire new system capabilities (as required)												
5. Define Standard Operating Procedures (SOPs)												
6. Hire staff (as required)												
7. Train help desk personnel												
8. Implement help desk technology												
9. Coordinate with agency support resources												
10. Communicate new process to end users												
11. Implement new coordinated systems												

Costs	Year 1	Year 2	Year 3
Capital:		107,500	
Operations:		304,500	244,500
Total:		412,000	244,500

Capital Costs: Year two.
Operations Costs: Continue indefinitely with new staff.

OUTCOME MEASUREMENT

- Number of calls handled
- Percent of questions answered on first call
- Response times
- User satisfaction (measured through surveys)
- Help desk costs

A3. Utilize the State of Washington's Digital Academy to promote learning.

Timing: PHASE ONE	Difficulty: LOW

– Time must be freed up from day-to-day operations to participate.

– Targeted participation must occur through identification of those personnel who will maximize the opportunity, and bring back and apply such knowledge.

The concept behind the State's Digital Academy is to "learn while doing." This concept combines two elements. The first is to establish an environment where people come together to learn about Web-based technologies. The second is to gain knowledge through real-time activities associated with building e-government applications. The approach brings both end-users and technical personnel together to generate ideas, establish needed processes and requirements, and eventually define an approach and design for specific application deployment. To date, the Academy has run three series of sessions, one each for permitting, e-forms, and licensing. A fourth session is being discussed and may pertain to content management. Each of these application areas is potentially valuable to the County.

The State has offered the Digital Academy to the County at three levels, including (1) participation in regularly scheduled sessions, (2) attending courses that cover past topics, and (3) conducting new courses that move the previously developed Web applications to the "next level" of functionality.

BUSINESS CASE

The direct benefits of participating at the Digital Academy directly tie to the underlying concept of learning while doing. This strategy directly supports the County's e-government initiative by increasing Web-based knowledge within the organization, helping establish standards for development, and setting the stage for cost-effective fast-track development. Essentially, participating personnel are able to accomplish two things at the same time. Attendees are able to gain state-of-the-art know-how while at the same time jump-starting the implementation of needed applications. When considering that personnel bring home the expertise to develop needed applications, the Digital Academy effectively provides a development blueprint to follow, possibly reducing the time and expense required in the development process. Through participation in Academy sessions, requirements are defined, and development approach and design established. This classroom knowledge may be brought home immediately. Further, there is a likely added benefit to the County of helping to establish technology standards.

The costs of participation are moderate. There is a modest registration fee involved (likely for each County agency). The entry fee is assumed to be the same whether one or several people attend the sessions. The larger cost involved is associated with time commitments, as each course spans a 13-week period (one day per week). When multiple personnel are participating, the time will add up. It is assumed that multiple agencies' personnel would attend together. The out-of-pocket costs are considered competitive in comparison to other training of the same caliber.

When benefits are compared to costs, the payback is potentially significant. While each session/application requires separate evaluation, it is conceivable that the Academy will save the County thousands of dollars for each application needed. This premise is based upon an average of hundreds of development hours not required. The risks of development are also assumed to be reduced as the probability of successful application deployment is increased.

Related Technology Needs:	Related Business Goals/Objectives/ Directions/Opportunities:	Related Deficiencies:
• End-User Training • Technician Training • Agency Coordination	• Improve/Expand Services • Empower Employees • Establish Communication and Collaboration • Enhance Skills	• There is limited cross-training between agencies. • Training is managed tactically versus strategically.

Costs:			Payback:		
Low	Moderate	High	Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Assign coordinator(s)												
2. Evaluate past and future Academy topics												
3. Compare County needs and determine value of each session												
4. Coordinate with State Academy												
5. Target personnel participation												
6. Schedule and attend												

Costs	Year 1	Year 2	Year 3
Capital:			
Operations:	72,500	72,500	72,500
Total:	72,500	72,500	72,500

Capital Costs: N/A.
Operations Costs: Continues indefinitely.

OUTCOME MEASUREMENT

- Number of staff participating
- Increase in skills (tested/surveyed)
- Resulting applications developed
- Number of applications utilized by end-users
- Time required for developing/implementing new systems
- Standardization across systems

A4. Use the Internet as a primary mechanism to deliver public information and services.

Timing: PHASE TWO	Difficulty: MODERATE

– Requires new internal skills for development and/or hiring of external help.
– New business model to County, not widely understood — impacting ability to deliver and requiring revision of business processes.
– Lack of track record and management capabilities to oversee such work.
– Requires significant time.
– Delivery of applications will add up in terms of cost.

King County has embraced digital government with the ultimate goal of delivering improved service to the public. This initiative is based upon a vision of employing new business models, new methods of communications, and new technologies. The result will be increased service provided to the public through empowered employees supported with the best technical resources.

This strategy is specifically designed to use the Internet to address government-to-citizen (G2C) services while issues related to using the same technology to enhance connectivity with employees and external business partners are addressed below in the section that outlines an intranet and extranet strategy. G2C is accomplished by providing information pages and e-services directly to the general public. The manner in which the public will be served will evolve over time as the County's technical capabilities mature. The next generation of County G2C services is evolving on a natural path by conducting business along four stages of change: establishing a presence on the Internet, interaction between parties, transacting business, and transformation. These County phases are in direct alignment with those

described in Gartner's E-Business Model. The County's evolution is being staged through the following:

1. "Presence"—primarily being one-directional and providing relatively static content
2. "Interaction" between parties—involving two-way exchanges of information
3. "Transacting"—providing two-way e-services through specific business transactions
4. "Transformation"—conducting e-services through automated business collaboration and realigned business processes

The County is in the early stages of a natural migration to e-government. Currently, the County is primarily between stages one and two. It will be important to establish more structure in order for the County to successfully evolve further into stage three. The County is not yet contemplating a move into the transformation stage.

The focal point of the County's Internet efforts is the County's Web site. This mechanism is a rich source of information for the residents of King County as well as the public at large. The public Internet site presents a broad array of information about the County, its government, and current news relating to the activities and services. The site provides basic answers to the questions of —

- *What* agencies exist and what services are provided?
- *Who* should be contacted for additional information?
- *Where* should one go to acquire services?
- *How* does one get there?

There are literally thousands of pages of information regarding the County's various agencies, departments, divisions, sections, offices, and the services provided. Table 25 summarizes the types of information and services provided on the County's site.

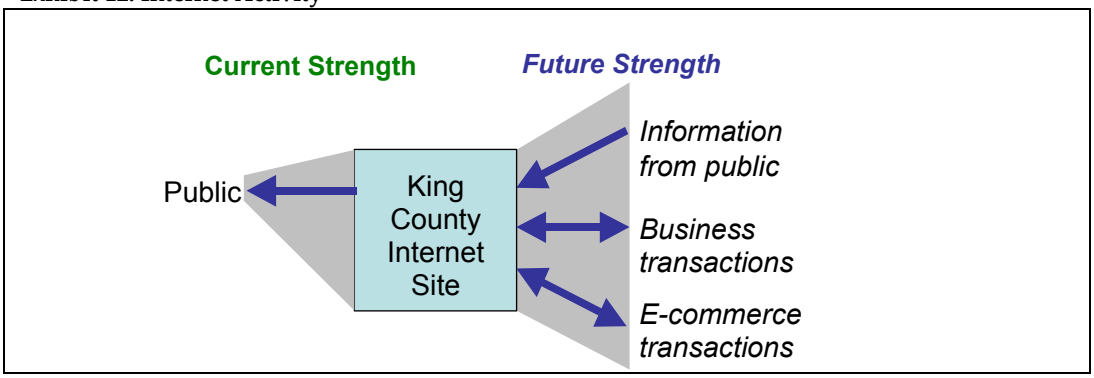
Table 25: Internet Site

Information/Services
Information about the County, its governmental agencies, and the services provided
News relating to County government, projects, improvements, events, etc.
Service and subject indices containing links to pages that are part of the County's site
Links to non-County pages, resources, and services
Forms, documents, and reports to download or print
Ability to send comments or suggestions to agencies
Special sites for weather and other emergencies
Ability to register for e-mail notification of specific types of events (e.g., road closures)
Query facilities to several special purpose databases including property tax look-up
Several GIS-based applications
Public testimony recorded
Bus passes, birth and death records, and vehicle license tab renewals available through electronic purchase

Currently, the County Web site is rather limited with respect to the complete range of functions that are possible. In general, the County Web site is information rich, but very limited with respect to services. There are, however, notable exceptions to this assessment. The following are examples of existing Web-based information services that are relatively sophisticated in design and function: GIS's Imap, DDES's parcel locator, Metro's Trip Planner, MYCOMMUTE, streaming audio/video of Council meetings, and the County online directory.

The County has a significant opportunity to transform its Internet site from a relatively static site to one that is more interactive and conducts more business over the Internet. When the move is made to be more interactive, the value of the site to the public will increase. Examples of activities that may be automated include scheduling a picnic site or signing up for a class or to attend a meeting. Examples of basic financial transactions that may be placed online include paying for property taxes and traffic tickets, or buying a pet license. This move to two-way activity is illustrated in Exhibit 12.

Exhibit 12: Internet Activity



While recognizing the four stages in Gartner's e-business model, numerous specific target areas have been defined for the County to consider in its development efforts, including: Presence — enhanced information dissemination; Interaction — online information submission; Transacting business — online request-response (nonfinancial) transactions and e-commerce (online transactions including a financial component). The four target areas have been identified through a review of what peer organizations are doing, consultant ideas, and agency input. Each of these areas is discussed further below.

a) Presence — Enhanced Information Dissemination

A significant amount of staff time across the County is spent responding to requests from the public for information. Most often these requests come in the form of telephone calls. There are many instances in which providing Internet access to information already available in a database would improve service to the public and reduce cost. This means that the Web site could substitute for the more costly resource of a person answering the phone. One example is at the Department of Development and Environmental Services, which recently completed an application that makes building permit status information available online. DDES anticipates that this will result in a significant reduction in the number of phone inquiries that are handled by staff on a daily basis. Another example of an existing application of

this type is the Sheriff Office's Sex Offender Database that supports queries by last name and zip code.

Table 26 presents candidate **new** applications for *information dissemination* via the Internet.

Table 26: New Applications – Information Dissemination

Agency	Application
Adult and Juvenile Detention	• Subjects in custody — information about charges, cause number, bail, court date • Inmate information — information for inmates and families
Courts	• District Court calendar (dynamically updated) • Superior Court calendar
Elections	• Voter information by address/zip code
Emergency Management	• Access to online reports and archived reports
Judicial Administration	• "Point of Entry" information for the public — a searchable database containing answers to the most frequently asked questions concerning King County's judicial system
Prosecuting Attorney's Office	• Posting of daily advisories • Sentences — information about sentence handed down (updated on a weekly basis)
Public Health	• Online searchable catalog of information resources available
Solid Waste Division	• Reuse/recycler information
Sheriff Office	• Crime frequencies by area with map display • Sex offender map display • Outstanding arrest warrants • Deadbeat parent database • Nonemergency incident reporting

Table 27 presents candidate **upgrades** to existing *information dissemination* applications.

Table 27: Upgraded Applications – Information Dissemination

Agency	Application
Budget Office	• Publishing of proposed County budget in fall • Publishing of approved County budget in late winter
Elections	• Online voters pamphlets (improvement)

b) Interaction — Online information submission

Collecting information via the Internet is another prime area for Web automation at the County. In general, very little information is received by the County from the public via the Internet. Currently, visitors to the site have ample opportunities to send comments or requests via e-mail to agency Webmasters or other individuals who are named on the various agency pages. However, much more could be done to make the Web site a more valuable and convenient vehicle for the public to send information of a more specific nature to various agencies and divisions. Several primary advantages of utilizing the Internet to collect information include information collected in a machine-readable format eliminating the need for manual

data entry; applications improving the accuracy and completeness of the information supplied; an automated response indicating receipts generated, a formal record of public correspondence, and measurement of the County's customer service. The following list provides several examples of how a relatively simple Web form could be used to collect information that is potentially valuable to the County.

Table 28 presents candidate **new** applications for *online information submission* via the Internet.

Table 28: New Applications – Online Information Submission

Agency	Application
Countywide	• Information surveys and/or polls
DOT — Roads	• Problem reporting (e.g., potholes) • Requests for road maintenance or improvement
Licensing and Regulatory Services Division	• Lobbyist registration
Finance	• Online submission of responses to RFP/RFQ/RFI requests

c) Transaction — Online requests with response (nonfinancial) transactions

For some nonfinancial business transactions it is feasible to include an immediate online response to a request submitted via the Internet. This is true of database queries, but this category of application includes more than simple database query processing. This type of transaction requires not only the retrieval of information in a database, but the examination of the data received (perhaps through a comparison with data previously recorded), evaluation of applicable business rules, and recording of new information including the result (success or failure) of the request. As an example, consider an online application to schedule meeting rooms that may be reserved for public use. Responses may include the following: "Your reservation has been accepted," "You already have a room reserved for that time," or perhaps a list of alternative rooms, if the one requested is unavailable. Generic examples of transactions of this type that do not require payment of fees include submission of a simple application, scheduling of meeting(s), submitting information to an online directory, and reserving a facility.

Table 29 presents, within the County, **new** applications for *online request — response (no-financial) transactions.*

Table 29: New Applications – Online Request with Response

Agency	Application
Courts	• Jury Duty Summons o Request for rescheduling o Request for deferral
Countywide	• Request to schedule meeting rooms
Sheriff Office	• Online reporting of o Suspicious activities/persons o Crimes • Responses to requests for information

d) Transaction— E-commerce (online transactions including a financial component)

An e-commerce application is similar to those described in the above category, as it includes use of business rules and recording of information in a database. In addition, it will include one or more financial transactions, such as authorizing an amount to a credit card account, debiting a credit card account, crediting a credit card account, and using other payment methods such as Internet checks. Automating these types of processes will force changes in the way the County conducts business. Within the County, at the time of this plan, there are two e-commerce applications accessible via the Internet site. It should be noted, however, that both of these applications are hosted by an independent service provider. The three existing e-commerce applications include the online purchase of Metro bus passes, online order of vital records — services provided by VitalChek, and the State's online renewals for vehicle registration.

Additional, other candidate **new** applications for *e-commerce – online transactions* are presented in Table 30.

Table 30: New Applications – E-Commerce Online Transaction

Agency	Application
Department of Transportation	• Fleet Store[3] • Map Counter
Parks Division	• Online ticket sales to special events • Event and facility scheduling/reservations
Sheriff Office	• Sale of patches and other items
Finance	• Property taxes
DNR	• Wastewater capacity change
DDES	• Permits • Business licenses
District Court	• Fines • Small claims filings
Licensing	• Pet licenses
Superior Court	• Filing fees

It should be noted that the County is evolving through the first three stages of Internet revolution. The fourth stage of transformation has not yet been planned.

BUSINESS CASE

The slow transition from paper-based systems and face-to-face servicing is burdening the County with obsolete ways of providing information and services to the public. The benefits of using the Internet as a mechanism to increase and improve the public interface may be grouped in three categories: financial, service, and efficiency. Internet opportunities should be scrutinizing on a case-by-case basis. Within this business case, numerous representative examples are identified. While all are being pursued, realized benefits have yet to be documented.

[3] Fleet Store = Public Transportation Store

The use of the Internet has the direct potential to produce cost-savings and cost-avoidance benefits. The first benefit category requiring recognition is financial. Simply put, Internet-based communications and services with the public are considerably less expensive for the County to conduct, not only because of the added staffing efficiency of Web-based transactions, but also because of the reduction of overhead necessary to support manual processes. The comparative costs of doing business either by phone or written form are substantially higher than Web-based interaction, as noted in the research conducted by the City of Sunnyvale (CA) in Table 31:[4]

Table 31: Comparative Costs of Internal Processing

Cost of Individual Payment Transaction	
U.S. Mail	$ .73
Telephone	.54
Internet	.01[5]

Sunnyvale is not alone in recognizing the potential savings of such ventures. For example, several counties in New York have recently adopted an automated hunting license program with a Web front end from which the counties expect to save $250,000 per year starting in the first year, up to a maximum of $1 million per year by the fourth year. The point here is that counties are experiencing direct cost reductions in their business models, in this case through streamlined license-renewal processes. The savings have come directly in the form of reduced paperwork, decreased staff hours, and less costly premiums. Moreover, the retention of licensees means that more people are apt to participate in the program instead of becoming disconnected from the regulatory process.

Cost alone is certainly not the only measure of the County's fulfillment of its mission. A more actualized Internet presence will also enable the organization to serve the public in a more responsive and effective manner. The ability for a resident to pay taxes, securely access records, submit forms and license renewals, and be continually updated on County functions leads to a more healthy governmental and public policy environment. A citizenry that is engaged with its governing body is more likely to support it when the County is providing efficient service including that provided on the Internet.

While many in the public will not be quick to recognize "behind the scenes" cost savings of Internet-based automation, they will acknowledge the added efficiency and information sharing of an improved Internet presence because this capability has a clear impact on County public services. One of the more notable success stories in this area comes from New Mexico's Department of Human Services, where an online child support database was implemented that allowed single parents instant Web-based access to determine the status of child support payments. Whereas this information used to be available only after spending inordinate amounts of time in phone queues or by mail, the new online "service provides real-time information on payments and allows custodial parents to set up direct deposit of checks into their banking accounts. Parents in the program also manage their cases online, check for news updates, such as the

[4] City of Sunnyvale Information Technology Strategic Plan, January 1999
[5] Staffing support related to internal processing.

establishment of paternity, and may even modify a support order."[6] While the program has considerably reduced costs (because of decreased staffing and higher levels of efficiency), the most palpable benefits have been the added service for those in need.

It may be concluded that the greatest savings available is through the increase in efficiency. The labor-intensive routines of data entry, mailings, and processing paperwork are greatly reduced. A representative example of such gains is found in the State of Arizona, which is in the process of implementing online bid solicitation that considerably reduces the workload required to sift through solicited proposals. The reduced overhead of "the proposed electronic contracting system will not only automate some of the labor-intensive steps, but will also reengineer and streamline operations, making the process more efficient and cost-effective. In addition to centrally managing the State's bids process, the electronic contracting system will significantly reduce the lag time in proposal evaluation. More importantly, it will free up staff time to focus on bid analysis and negotiations."[7]

The purpose of the above illustrations is to identify the significant differences in the cost, service, and efficiency factors of handling data in electronic form. While this strategy avails itself to new technology, the costs associated with building this infrastructure are more conventional. Capital costs include those related to procuring equipment and software, and building Web site capabilities. Operating costs include the costs of maintaining the sites and processing ongoing transactions. Because systems provide a substitute for daily interfaces with dozens of personnel, the benefits of lower ongoing labor costs far outweigh the costs involved with development and ongoing maintenance functions. It may be concluded that the net benefit of moving to the Internet as a primary mechanism to deliver public information and services is positive. Overall, as with other systems targeted for implementation, each application should undergo detailed cost/benefit analysis prior to development.

Related Technology Needs:	**Related Business Goals/Objectives/ Directions/Opportunities:**	**Related Deficiencies:**
• Proactive Service Delivery • Planning and Design • Internet/Intranet Access	• Improve/Expand Services • Empower Employees • Manage Data and Information • Ensure Greater Public Awareness • Demand for Increased Public Information	• Current emphasis is mostly limited to static "public information" rather than interactive "public services." • The County is behind some of its peers in implementing and realizing the benefits of e-commerce.

Costs:			**Payback:**		
Low	**Moderate**	**High**	**Low**	**Moderate**	**High**

[6] http://www.govtech.net/magazine/story.phtml?id=3030000000004282.0
[7] http://www.govtech.net/magazine/story.phtml?id=3030000000004274.0

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Define potential applications for development												
2. Select technology (in alignment with standards)												
3. Conduct cost/benefit analysis												
4. Obtain approval and funding												
5. Assign developers												
6. Develop specifications, design application												
7. Gain approval												
8. Develop												
9. Define business processes												
10. Document requirements and design												
11. Test												
12. Document												
13. Train												
14. Implement												

Costs	Year 1	Year 2	Year 3
Capital:		260,000	260,000
Operations:		430,000	428,000
Total:		690,000	688,000

Does not include complex development and integration.
Capital Costs: Continue annually indefinitely.
Operations Costs: Continue annually indefinitely.

OUTCOME MEASUREMENT

- Number of applications successfully operating on Web
- Number of improved business processes
- Level of utilization by the public (as measured by "hits" and numbers of transactions)

A5. Promote and support the development of the employee intranet and partner extranet to improve information services and business process support.

Timing: PHASE TWO	Difficulty: MODERATE
– Requires expanded skills and resources. – Evolving business model in which employees and business partners must learn and adapt to use new automated mechanisms.	

Besides public access to the County through the Internet, the County is positioned to conduct business with three other groups of constituents over its network: employees, businesses, and other governments. This strategy is set to expand on e-government by connecting —

- Government-to-Employee (G2E) — over the County's intranet through the collection of internally accessible information pages and Web-enabled services made available to employees in the execution of day-to-day business processes;
- Government-to-Business (G2B) — over an extranet through the collection of limited access information pages and Web-enabled services made available to specific business partners of the County;

- Government-to-Government (G2G) — over an extranet in the same manner as businesses, with government entities at all levels that are collaborating with the County.

Both the County's intranet and extranet are considered fundamental to increasing use of the Web. Because of the direct business benefits available, the County should consciously shift its development orientation to the net when it is cost-effective to do so. In this regard, executive management should strategically define the intranet/extranet to be key components of the County's technology navigation and define and support integration of these technologies into the County's planned architecture.

The intranet is the primary resource connecting employees to functions on the LAN or the WAN. Simply put, the County intranet is the set of information pages and Web-enabled, browser-based applications used by employees to conduct daily business. Likewise, for business partners, the extranet is a secure, limited access Web resource (information- and browser-based applications) maintained by the County to connect with authorized business partners and other governments. The extranet may be used to conduct business with special constituencies external to the County, including other governmental agencies, nonprofit business partners, educational and research institutions, and commercial product and service providers. In the past, this has been done by allowing partners secured access to the enterprise WAN. At present, most sharing and collaboration is supported through secured Internet connections. However, many cost-effective extranet opportunities exist to conduct collaborative business. Both the intranet and extranet(s) may be part of the same business solution and built from the same common technologies.

Based upon the interviews conducted as part of this study, there is a significant amount of planning underway as well as current development to "Web enable" many internal applications that are used by County employees for conducting day-to-day business. A twofold shift is occurring to develop browser-based applications as well as to convert ("Web enable") and/or add new browser-based interfaces to existing internal County applications. The reason for this shift is very practical. In general, browser-based applications provide easier access, a consistent look and feel, and typically reduce the efforts and costs associated with desktop support. The County can make good use of a revamped intranet by borrowing ideas from other public and private sector entities. Potential applications are listed in Table 32:

Table 32: Potential Intranet Applications

• Online posting of County regulations • Web-based technical and application training • Performance data • Facilities list – (rooms, addresses, etc.) • Organizational charts • Help desk interface • Customer relations management notes and tools • Online posting of standard operating procedures	• Vendor contact information • Online HR information (self service) • Conference room sign-up • Pool-vehicle reservations • Online collaboration tools (chats, newsgroups) • Office supply ordering • Project tracking using MS Project or other tools

The extranet may also be used effectively through sharing data with external parties such a business partners and other governmental entities and associations. Examples in the field of this type of usage are listed in Table 33

Table 33: Potential Extranet Applications

• Project management tools for collaborating third parties • Sharing ideas and documents with a select group such as other governments • Online training by vendors • A way of using high volumes of data using Electronic Data Interchange (EDI) • Collaborating with external companies on joint development and programming efforts • Sharing news of common interest exclusively with partner governments • Data collection for polling • Shared databases with vendors • Supply chain connectivity (order entry, reporting, inventory) • Billing

Clearly, there is much the County can do to utilize the cost-effective Web-based platform for increasing information sharing with both employees and external partners. These relatively low-maintenance applications will serve both the organization and its group of constituents well.

BUSINESS CASE

For the same general reasons that the Internet will better serve the public, the intranet and extranet will better connect and serve both employees and the County's business partners. That is, technologies may be used to increase access to information and strengthen connectivity, while also allowing the County to be more cost-effective in the delivery process. The relevant business premise is that the net, once built, will significantly reduce the amount of labor necessary to conduct business and to maintain systems.

Examples of cost savings through the use of secured and robust extranets abound. The Government of Alberta has recently implemented an online browser-based "e-billing" solution to handle invoices from vendors. Operating costs have been significantly reduced because the bulk of invoice processing is now automated. In the words of Stan

Hayter, Assistant Deputy Minister, "Since installing [the] 100 percent Web-based solution to completely automate our invoice management, we are expecting to save more than $500,000 (Canadian) in our first year." He adds, "And the solution also saves our suppliers' time and money. In fact, one supplier will be saving over $100,000 in postage and handing costs alone by sending in bills electronically. As we add more suppliers to the application, others are approaching us to get online."[8]

Web-based extranet interfaces are paying for themselves in reasonable time frames, generally recouping their extranet investments in two to three years.[9] While examination of such applications is still required on a case-by-case basis, especially considering levels of utilization and corresponding time savings, it is known that companies forging extranet bonds with distributors spend less time dealing with account questions, processing orders, managing paperwork, and disseminating information to partners.

Intranets are also both time- and dollar-saving endeavors. For example, industry "analysts estimate that 18% of corporate printed material becomes outdated within 30 days. Documents that are printed and mailed, such as internal phone books, policy and training manuals, requisition forms and marketing materials, can be put on an internal web server and updated for a fraction of the cost of printed material. It is not only the publishing but the updating of information that leads to savings."[10] The use of an intranet for internal information sharing, particularly in areas where the data is continually updated and having to be republished, has the capacity to save considerable resources for the County through reduced printing and distribution costs.

The ability for employees to quickly get the information needed will also benefit the County. Quick access to even simple items such as online benefits forms and information directories often saves the time that would be otherwise required for a phone call or visit to the agency HR Coordinator. As the availability of information becomes increasingly work specific and directly applies to a person's job function, rapid information retrieval from an online source will further increase savings. One organization that is experiencing a positive return on investment is the SAAB Corporation, which recently moved to an intranet for key customer support positions. The corporation expects a positive return on investment in only two years' time.[11]

Finally, Web-based intra- and extranets also allow for 24x7 productivity in the workplace, providing opportunities to make use of the hours before and following the typical workday. Organizations that allow for productivity during these "off hours" allow for both flexibility in the workplace as well as a more highly effective workday. Similar to what was noted in the earlier strategy related to the County's use of the Web for enhanced and efficient contact with the public, the benefits and cost savings of using intranets and extranets for contact with employees and business partners are significant. The return on investment in this area will greatly benefit the County.

[8] http://www.Microsoft.com/business/casestudies/upside_Alberta.asp
[9] http://www.cio.com/archive/webbusiness/020499_extranet.html
[10] http://www.intrack.com/intranet/ireturn.shtml
[11] http://www2.software.ibm.com/casestudies/swcs.nsf/customername/CB02138FB46FD8FD8725699B002C15B7

Related Technology Needs:
- Planning and Design
- Internet/intranet Access
- Agency Coordination

Related Business Goals/Objectives/ Directions/Opportunities:
- Improve/Expand Services
- Optimize Analysis, Assessment, and Improvement Practices
- Establish Communication and Collaboration

Related Deficiencies:
- The County is behind some of its peers in implementing and realizing the benefits of e-commerce.
- The County intranet is a rapidly expanding in a relatively unmanaged manner.
- Little work has been done on the extranet with respect to infrastructure development.

Costs:		
Low	**Moderate**	High

Payback:		
Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Acquire development tools												
2. Develop/agree on standards												
3. Determine/assign development responsibilities												
4. Hire staff (as required)												
5. Define potential applications (for development)												
6. Select and agree on applications, prioritize based upon cost/benefit												
7. Design specifications												
8. Design application												
9. Gain approval												
10. Develop applications												
11. Test												
12. Document												
13. Train												
14. Implement												

Costs	Year 1	Year 2	Year 3
Capital:		415,000	415,000
Operations:		424,000	440,000
Total:		839,000	855,000

Capital Costs: Associated with hardware, software, and development with $240K continuing annually indefinitely.
Operations Costs: Continuing annually indefinitely.

OUTCOME MEASUREMENT

- Successfully deployed applications and connections
- Level of utilization by employees and business partners
- Amount of time saving/cost reduction through increased and more timely information access and processing of business applications

B. Operations

Four operations strategies have been developed for consideration. Subject areas are the following: asset management, standard operating procedures, system security, and business continuity. Related to strategy development, operations weaknesses of particular concern include the following:

- A lack of comprehensive asset management whereby assets are managed on an enterprise level rather than reactively within agencies.
- Other than for the mainframe, few standard operating procedures are defined to guide those responsible for performing similar duties across the County.
- A high level of vulnerability in the area of technology security related to internal and external threats.
- A serious lack of business continuity planning, which will limit the County's ability to recover in the event that technology fails for an extended period of time.

B1. Establish a comprehensive asset management function.

Timing: PHASE ONE	Difficulty: MODERATE
– Ongoing funding will be significant at times. – Must hire a trained asset manager. – Automated systems are required to adequately track assets. – Requires ongoing analysis, and alignment of procurement, maintenance, and disposition activities. – Personnel from all agencies must coordinate efforts.	

The County's current approach to asset management is piecemeal. Most managers believe that current inventory activities and tracking of assets suffice as asset management. Although inventory and tracking activities are vital, the functions are only the beginning of what asset management is about.

The heart of asset management is determining the proper balance of procurement, repair, preventative maintenance, upgrade, and replacement activities. While saving money is a primary goal of asset management, another is to provide an asset base that supports agency personnel. To this end, very little asset management is occurring presently. A key indicator is the fact that planned multiyear maintenance, upgrade, and replacement schedules largely do not exist. What schedules are in place are not typically based upon analysis that defines the optimum points of maintenance and asset replacement.

In the field of asset management, the County requires a trained resource manager. This individual will conduct analysis related to determining the condition of assets, and more importantly, how assets will be maintained. An integral core of asset management is an automated asset management system. These powerful computer systems help asset managers make sound decisions through optimization tracking applied to the pool of assets. Because asset condition directly impacts the ability to maintain particular service levels, asset management is deemed critical to the overall technology program and managing the total cost of ownership. Asset management will directly impact the County's plans for replacement, vendor relations and contract terms, system life spans, contents of service-level agreements, and the ability to budget at an enterprise level.

Perhaps the most visible example of where asset management is needed is in the area of PC replacement. The County has been examining the issue of establishing a structured program for a number of years. Both the 1999 and 2000 County technology plans reference the need for such a program. A PC replacement program would establish a comprehensive program to optimize equipment lifespan of the County's 10,000 workstations. A formal asset management function will examine all computing assets and determine a replacement schedule aligned with a proper budget. In the case of desktops, the program would confirm whether an optimal time for replacement should be at the four- or five-year point, following industry standards.

Through effective asset management, the County can also make cost/benefit decisions regarding the replacement or upgrade of systems by analyzing the total cost of ownership. To accomplish this, the County will need to do the following:

- Maintain an up-to-date inventory.
- Coordinate replacement with software deployment.
- Direct replacement of a percentage of units annually.
- Negotiate master contracts to achieve economies of scale.

Clearly, the benefits of a well-organized and formal asset management function will lead to increased savings for the County. Replacement of the current piecemeal approach with a deliberate and effective management process will cost effectively balance and track all aspects of lifecycles, leading to quantitative savings.

BUSINESS CASE

When properly implemented, a centralized asset management system constantly provides information that empowers management to make both tactical and strategic decisions about the enterprise. The benefits of supporting comprehensive implementation are numerous and the costs are modest. Specific benefits include the ability to do the following:

- Identify and remove dormant assets.
- Prevent unnecessary purchases.
- Perform improved procurement analysis.
- Perform faster and more accurate budgeting and forecasting activities.
- Identify vendor accounting errors and manage cash flow through invoice validation.
- Prevent duplicative enterprise assets.
- Enforce service-level commitments.
- Strengthen the negotiations position with vendors.
- Avoid noncompliance penalties (including licensing).
- Provide improved issue management via the help desk.
- Empower change management.[12]

[12] "Asset Management: Formalizing a Process for Technology Investments," White Paper [electronic document], Copyright 2001, Predictive Systems Available at http://www.predictive.com/resources/papers.cfm

In addition to these benefits the Gartner Group estimates that "'every organization can realize cost savings of between 2% and 7%' by getting serious about asset management."[13] Furthermore, the Meta Group reports, "By enabling companies to gain efficiency through better control of their technology, asset management tools lead to bottom line results."[14] This asset management strategy specifically addresses one of the four deficiencies related to King County identified in Governing.com's Government Performance Project 2001, related to establishing an IT replacement policy.

One example in which an organization implemented comprehensive asset management and achieved significant results is the Los Angeles County–USC Medical Center. The medical center implemented a materials management system, which saved $1.5 million in the first year and an anticipated $600,000 for each following year.[15] One important aspect of this system included improved technology management.

While the Gartner Group reports that asset management for technology continues to be done informally at many organizations, Predictive Systems, a leading technology and infrastructure consulting company, estimates that by 2003 an estimated 60% of IS organizations will, or plan to, implement formalized asset management processes to improve IT cost effectiveness and control. It is clear that asset management will benefit the County by aggregating all significant technology resources under one managed program.

Related Technology Needs:	Related Business Goals/Objectives/ Directions/Opportunities:	Related Deficiencies:
• Service Level Commitments • Neglected Technology Management Functions • Planning and Design	• Utilize Cost-Reducing Technologies • Efficient/Effective Use of Technology	• There is no Countywide asset management program in place. • There is no "one central source" for conducting asset management and no standard practice for depreciating equipment. • There is a lack of understanding of the basic purpose of such a program, that being to optimize assets' useful life.

Costs:			Payback:		
Low	**Moderate**	High	Low	Moderate	**High**

[13] "Asset Management: The Elusive Search for the Holy Grail," White Paper [electronic document]. Janus Technologies, Inc. and Tangram Enterprise Solutions, Available at http://www.janus-tech.com/Asset_Mgmt/Tangram.html
[14] Gale Group, Inc. and 101 Communications, Inc., "Trim the IT Budget," *Enterprise Systems Journal.* 16 (No. 10, 2001): 60.
[15] "Inventory and Materials Management," (January 6, 1982) [electronic document]. Los Angeles County Citizens Economy and Efficiency Commission, Available at http://eec.co.la.ca.us/pubfiles/realasst/pubframe.htm

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Hire an asset manager												
2. Complete/Maintain a centralized inventory of assets												
3. Assess asset condition.												
4. Define hardware/software standards (annually when required)												
5. Establish vendor relationships/negotiate master contracts												
6. Define requirements/acquire and implement systems												
7. Establish/maintain enterprisewide licensing program (with software)												
8. Develop a plan with schedules for maintenance, upgrades, and replacement by agency (and update annually)												
9. Conduct centralized asset management												

Costs	Year 1	Year 2	Year 3
Capital:	500,000		
Operations:	100,000	160,000	160,000
Total:	600,000	160,000	160,000

Capital Costs: Associated with establishing function.
Operations Costs: Continue annually indefinitely.

OUTCOME MEASUREMENT

- Plan established and updated annually
- Asset management system procured and utilized
- Inventory tracked in one central location
- Maintenance schedules produced (where relevant)
- Optimized asset life spans supported by cost/benefit metrics
- Total cost of ownership known, tracked, and managed

B2. Develop standard operating procedures to guide all agencies' technology staff.

Timing: PHASE ONE	Difficulty: LOW-MODERATE

– Takes time to assess and document detail involved.
– Requires agreement among technical staff.
– Must assign responsibilities (ownership) to track ongoing changes and maintain documentation.

Standard operating procedures (SOPs) are published common tasks to be followed in a uniform manner and adhered to by those who perform the same or similar duties. In short, organizations use SOPs to "document what they do and do what they document."

The requirements for effective SOPs are threefold. First, they must clearly communicate how a particular function is to be performed in a step-by-step manner. Second, they must be continually updated and communicated to staff as requirements and methods change. Third, there must be management over SOP utilization to ensure that the steps are closely and regularly followed. Successful implementation of an SOP program cannot overlook any of these components because each is critical to success.

Design and implementation of the SOPs requires collaboration. SOPs should be developed by teams, wherein staff familiar with specific procedures are utilized in the development process. This collaboration will increase the likelihood of future utilization by making use of resident knowledge and through buy-in from those who will be following the procedures on a regular basis.

SOPs can be integrated into many aspects of the technology environment, particularly those areas that contain routine and consistent maintenance requirements. Examples especially relevant to the County include desktop image preparation, remote access configuration and setups, printer diagnostics and maintenance, and help desk guidelines for troubleshooting and resolving network connectivity issues. SOPs are ideal for relatively simple procedures that require consistency in execution and delivery.

The development and maintenance of the SOPs should be distributed across the County with the results being shared among agencies, perhaps through the intranet. With this model, SOPs may be defined both within particular agencies and between agencies extending to the enterprise level. The sharing of SOPs will also help a more centralized County IT department to monitor the quality of work in the distributed areas.

BUSINESS CASE

Standard operating procedures serve to ensure consistency and uniformity across an organization. Standard operating practices will help accomplish the following:

- *Ensure that operations are performed consistently to maintain quality control of processes and services*. Consistent technology performance and support across the County is an important goal that keeps some agencies from experiencing difficulty with inadequate support timelines and procedures. The SOPs will provide best practices checklists for ensuring consistent and adequate support, thereby allowing the County to more accurately monitor support in all areas of the organization.
- *Confirm that approved procedures are followed in compliance with County and other government guidelines.* Greater governance over technology support will allow the County to better monitor adherence to set policies and service-level agreements.
- *Serve as a training document for teaching new staff.* SOPs often serve as highly efficient ways of helping technology staff "get up to speed" when newly hired or when accepting new responsibilities. Measures gained here are improved efficiency of technology staff, decreased training costs, and greater flexibility in cross-training and resource pooling.
- *Provide a checklist for quality control and the reduction of errors.* Error reduction reduces staff resourcing needs and increases productivity because known problems are fixed quickly and with less staff time. The SOP checklist encourages the task to be successfully completed in a set period of time.

- *Stand as a historical record for revising process steps if changes are needed.* The County will be able to rapidly produce and update set procedures for quality monitoring and historical reporting, eliminating the need for inefficient "bursts" of technical writing when such information is required.

A set of well-conceived, well-written procedures can be an efficient set of tools for ensuring organizational efficiency and productivity.[16] Clearly, these benefits will have a long-term impact on County technology spending through the greater levels of efficiency, staff productivity, and production quality. The costs involved in development primarily will consume personnel time. Because this effort may be absorbed into the daily workload, there is potential for holding hard dollar cash outlays to a minimum.

Related Technology Needs:	Related Business Goals/Objectives/ Directions/Opportunities:	Related Deficiencies:
• Standards • Documentation of Existing Applications • Law, Safety, and Justice • Help Desk Support	• Optimize Analysis, Assessment, and Improvement Practices • Increase Revenues and Control Costs • Empower Employees	• SOPs around the County are mostly nonexistent. • Agencies often do not recognize the benefits of conducting business in a standard manner.

Costs:			Payback:		
Low	Moderate	High	Low	**Moderate**	High

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Identify needed practices/procedures												
2. Assign responsibilities												
3. Establish agreement on scope												
4. Develop SOPs/review/revise												
5. Formally document and distribute (via the intranet)												
6. Train personnel												
7. Implement/Maintain												

Costs	Year 1	Year 2	Year 3
Capital:	240,000	110,000	
Operations:		62,500	62,500
Total:	240,000	172,500	62,500

Capital Costs: Associated with developing SOPs in years 1 and 2.
Operations Costs: Continue annually indefinitely.

[16] Kenneth Friedman, Ph.D., "Guide to Writing Standard Operating Procedures," Dept. of Journalism and Communication, Lehigh University (March 1998).

OUTCOME MEASUREMENT
• Assigned responsibilities to develop and maintain • Established and maintained SOPs • Utilization and adherence • Changes in staff productivity • Improved quality of work

B3. Strengthen system security.

Timing: PHASE ONE	Difficulty: MODERATE
– Lack of internal expertise. – Requires full-scope assessment of current security status. – Funding is necessary to both assess situation and strengthen protection.	

The fundamental tenet of information security is controlling access to information and resources that require protection from unauthorized review, illicit modification, and obstruction of access. Very often, security protection is classified into the following categories:

- Confidentiality: The protection of the information against disclosure to unauthorized agents
- Integrity: The preservation of the data and the means to keep it from unauthorized or surreptitious modification
- Availability: The accessibility of information to authorized users in a timely manner

Control over data involves technical aspects (e.g., firewalls, applications, database and operating systems engineering, intrusion-detection systems), business process issues (e.g., separation of duties), procedural guidelines (e.g., incident-response and employee-termination checklists), and policy specifications (e.g., authorized use of the Internet). A comprehensive strategy must address all of these areas.

The County has issues in addressing security that have risk implications. The security posture of the County is decentralized management and administration, with no agency or department responsible for creating and governing standards designed for the security of the whole. This distributive blueprint may work well for localized infrastructure or help desk support but is not fitting for enterprise security in which any of the thousands of entry points into the wide area network can be used as a point of entry into the data and operations of other users. The result of the decentralized approach to security is characterized by a lack of current and uniform application, technical, business process, procedural, and policy controls. The lack of central management, the magnitude of the County's wide area network, and the fact that the perimeter to the Internet is not adequately guarded mean that security threats from both within and outside the organization may have already been realized but not detected.

Direct exposure points of the County include the following:

- Liability in the event that confidential human resource information was to be compromised and then made public.
- Liability in the event that healthcare and justice records were to be subverted.
- Threats to disruption in County operations and public services due to unauthorized manipulation of data or denial of service attacks.
- Business threats based on compromised integrity and availability of financial and other operational records
- Threats to County personnel and systems based on a lack of physical security.
- Inability to communicate and coordinate a response to an attack on County information technology assets.

The County can make significant gains in securing its networked systems and data, but the process will require centralization of security management and the deployment of new technical, process, procedural, and policy solutions. Examples of necessary improvements, with corresponding benefits, include the following:

- Execution of a comprehensive third-party information security assessment that is designed to identify and assess the specific threats facing the County. The deliverable from this assessment should outline detailed risks and ways in which the County can reduce exposure from both internal and Internet-based threats.
- Implementation of Countywide security policies and procedures that cover the specific hazards outlined in the risk assessment. Areas that should be covered are noted in Table 34 below.

Table 34: Needed Security Policies/Procedures

Potential List of Significant Policies/Procedures
Acceptable Internet use
Acquisition assessment
Auditing and logging
Application development and deployment
Operating system management
E-mail usage
E-mail storage
Extranet usage for activity on the frame connection with vendors
Information sensitivity and leakage
Passwords
Portable systems' (Palms, laptops) data storage and security
Remote access
Security roles and responsibilities
Risk assessment
Router security
Server security
Workstation procedures

Time spent designing and implementing policies and procedures will provide returns in three ways, namely, decreased likelihood of security events and loss, legal protections for the County from liability in the event that end-users conduct illegal activity using County-networked resources, and greater uniformity and efficiency of County technology assets.

- Enhanced technical controls over County local and WAN traffic that prohibit subverted hosts in one location from gaining access to other systems located on the County infrastructure. Proper security requires this capacity to contain subverted systems on a network as large as the County's. It is likely that firewalls, host-, and network-based intrusion detection systems will be required to suppress internal threats or compromised systems from being used to undermine other technology assets.
- Creation of an Information Security Manager, reporting at a high enough level to ensure compliance, responsible for establishing, monitoring, and confirming the implementation of security improvements. A single officer participating in active oversight of the security function will help ensure that there is defined and specific accountability regarding security concerns.

Security is a function that requires adequate preplanning and ongoing maintenance to be successful. The very nature of technology security requires the capacity for rapid change and adjustment to evolving threats. When examining the makeup of a successful security implementation, there are five functions that should be recognized to establish a sound program:

Assessment: This provides for the organization to have an ongoing understanding of its risk and specific vulnerabilities. While this often initiates with a third-party review, it is maintained through internal staff.

Protection: This includes the deployment and maintenance of enhanced security systems in the forms of hardware and software.

Management: This is the staffing component that can include internal or outsourced security specialists.

Training: This consists of instruction and awareness for users and technology staff. This can range from advanced technical training to simple user awareness of the threats contained in e-mail or reckless Web surfing.

Response: This can take the form of incident response plans and costs associated with damage to the network due to successful subversion through viruses or other malicious activity.[17]

Only by addressing each of these areas will success in information security be fully achieved. Security should be thought of as an ongoing process that impacts and involves all hosts and users sharing County data.

[17] http://www.scmagazine.com/scmagazine/sc-online/2001/article/033/article.html

BUSINESS CASE

The number and costs of security incidents are rising considerably across the globe. The United States Department of Justice reports that 85 percent of those surveyed reported successful security breaches, with 64 percent acknowledging financial losses due to the breaches. Not all public institutions have successfully implemented prudent policy, and a number of these have suffered high-profile security incidents. Locally,

- In January 1996, at least $200,000 of damage was done to the King County Public Library's computer system when an unknown suspect from Garfield High School's computer lab crashed the system for 12 days;
- The Washington State Legislature Web site was defaced with inappropriate subject matter in May 2001;
- In December 2000, the University of Washington Medical Center was the target of a hacker who compromised patient privacy by accessing thousands of medical records for heart patients, which contained names and social security numbers.

In each of these instances, there were costs associated with fixing the damage as well as the damage to the stature of each of these agencies that were successfully subverted. While the harm to an agency's stature is difficult to measure, it is known that the costs of fixing destruction done by hackers and malicious code is skyrocketing because of the increased complexity and malevolence of the attacks. For example, the 1999 "Melissa" virus did damage totaling roughly $80 million worldwide, and the more recent "I Love You" virus had estimated costs of $10 billion. To prevent future threats and help protect the County's assets, strengthened security is in order. A particular focus on network and application security should be a first priority.

By conducting a security and risk assessment, the County will be positioned to make prudent decisions based on obtaining an acceptable return on the security investment. Strengthening system security will help prevent several types of losses at the County, including data loss, costs of rebuilding technology, and direct financial loss. The preliminary costs are related to securing the County's infrastructure equipment and software. Ongoing costs include system maintenance and upgrades as well as the cost of personnel. At minimum, these initial costs will begin at $450,000 of capital and $171,000 moving up to $321,000 for operations thereafter to strengthen security through monitoring and protection activities. While these initial expenditures would be a start for enhanced security, a more systematic and costly security plan will likely identify additional needs. The cost/benefit relationship demands an increase in protection of the County's systems. It is assumed that through this increased protection, significant cost avoidance will occur.

Related Technology Needs:
- Standards
- Planning and Design
- Unattended Business Functions

Related Business Goals/Objectives/ Directions/Opportunities:
- Manage Data and Information

Related Deficiencies:
- Security policies and plans are extremely limited.
- Security staffing and management oversight is limited.
- The systems protecting the County are piecemeal, underperforming, and fragmented.
- Security weaknesses exist in various systems.
- There is no "Countywide" plan to address security.

Costs:			Payback:		
Low	**Moderate**	High	Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Hire a security officer												
2. Conduct security assessment												
3. Analyze findings												
4. Develop a plan addressing deficiencies												
5. Develop a security policy												
6. Implement security enhancements												
7. Perform regular testing and maintenance												

Costs	Year 1	Year 2	Year 3
Capital:	450,000		
Operations:	171,000	321,000	321,000
Total:	621,000	321,000	321,000

Capital Costs: Associated with security implementation.
Operations Costs: Continue annually indefinitely.

OUTCOME MEASUREMENT

- Security assessment
- Intrusion detection and monitoring capabilities
- Number of attempted intrusions
- Number and value of losses due to computer penetration

B4. Strengthen business continuity capabilities.

Timing: PHASE ONE	Difficulty: MODERATE-HIGH

- Requires significant skills and time to prepare plan.
- Significant funding/resources are required to provide robust ongoing protection.
- Next steps include analysis/modeling to define mission-critical applications and level of service to be provided.

The County is not currently prepared for a major disruption in technology operations. There is no comprehensive plan for conducting business in the event that operations and access were to be made unavailable without warning, either through natural or malicious causes. The lack of attention to an overall plan is considered unacceptable and should be remedied as soon as possible. Without a business continuity plan the County is not prepared to manage critical operations in the event of a major catastrophe.

The level of planning must consider all aspects of technology-driven operations at both the enterprise and agency level. This includes mainframe and server recovery, telecommunications, networks, and, more importantly, those mission-critical functions that depend upon technology, such as payroll, public relations, emergency preparedness, and transportation. All of these items must be addressed in a properly developed plan.

Based on business needs, the County may plan for business continuity using a comparison of costs and recovery response time for mission-critical systems. The comparison should include an examination of each relevant component of preparedness; for example, the facilities options available for the data recovery aspect of business continuity can be categorized as follows:

- Cold Site: A separate facility located a set distance from current operations that can be quickly converted to handle data access and minimal operations.
- Mutual Backup: Two separate agencies or organizations that have an agreement to host each other's operations if necessary.
- Hot Site: A redundant data center with preconfigured hardware, software, and data access capabilities.
- Remote Journaling: A hot site where periodic transmission of data is conducted, thereby decreasing the time needed to restore data if tapes were to remain available during the catastrophe.
- Mirrored Site: A fully redundant operations center equipped for instant availability.

Following the proper needs analysis, the County may consider pursuing shared emergency resources with another organization that operates a similarly complex environment. For example, the State, the City of Seattle, the Snohomish County PUD, the University of Washington, or even local vendors or companies such as Weyerhaeuser could be considered as potential colocation candidates for shared facilities, systems, and possibly even staff.

How the County chooses to operate under a disaster scenario is a matter for further analysis and discussion. In addition to needs and costs, the County's business continuity approach should carefully examine the County's current risk exposure and any available disaster mitigation and avoidance systems that are already in use. To determine what continuity efforts will be required, minimum operational levels must be defined and priorities agreed upon. Once plans are established, resources will be required to ensure that plans can be implemented when needed.

BUSINESS CASE

September 11 changed everything. As information technology departments in both the public and private sectors review budgets and goals for the upcoming year, one thing is now clear: disaster recovery and business continuity now have a more prominent place in technology planning and design. The traditional disaster recovery plan that simply outlines the data to be backed up and identifies restoration procedures is no longer considered adequate. While data retrieval and system recovery are still key components of such a plan, a solid preparedness design must handle aspects previously not addressed, such as transportation, communications, and insurance.

Proper planning can directly lead to successful recovery in the event of disaster. For example, while many business functions were crippled during the 2001 terrorist events in New York City, Merrill Lynch was able to resume business within minutes. The online Disaster Recovery Journal outlines the response:

> Within a few minutes of the evacuation Merrill Lynch was able to switch its critical management functions to their command center in New Jersey . . . Since the command center had been pre-designated in corporate-wide contingency plans, all personnel immediately knew where to dial into and transfer information. This allowed transactions throughout the company's global offices to continue as usual.[18]

This recovery was achieved despite the fact that over 9,000 employees were displaced, as were thousands of phone lines and data transmission conduits used by the company.

Another example of a prepared organization is the Tacoma Public School District, which operates an IBM mainframe and supports over 15,000 devices on its network connecting some 50 sites. The District has both a disaster recovery plan and a formal agreement with Weyerhaeuser to host the District's primary computing system in the event of a disaster.

The financial justification supporting this strategy is found in the concept of insurance. Like insurance, disaster preparedness establishes a system of protection that enables an organization to get back in operation in a timely and cost-effective manner. While there are costs or premiums required to maintain the plan, these are necessary to protect the County if a catastrophe were to occur.

[18] http://www.drj.com/special/wtc/1404-04.html

Establishing a resource base to support a sound recovery plan can be costly. In the event of a major disaster, recovery will require considerable attention at all levels in the organization. Resources needed include all major assets used in operation today including (1) facilities and utilities, (2) hardware and software, (3) data, (4) trained personnel, and (5) planned processes and procedures.

The financial payback supporting preparation is tied to probability and the risk of loss. Cost models may be developed to compare preparedness expenditures against the potential risk of loss under disaster scenarios. At some point, executive management will decide upon a break-even point at which a certain level of preparedness (and therefore expenditures) will provide a specific level of technology service if a catastrophic event occurs.

Numerous commercial entities have ceased operations because of the catastrophe in New York City. Though going out of business is not deemed an option for the County, "being out of business" in relation to technology for lengthy periods is a real possibility. This scenario is assumed to be unacceptable in relation to the County's charter and responsibility to service its citizens and employees. In this case, the reasoning behind this strategy is not to seek a positive return on investment (ROI), but to avoid unacceptable downtime and to be able to continue to deliver on the County's core mission of service delivery. This strategy specifically addresses one of the four deficiencies related to King County identified in Governing.com's Government Performance Project 2001, related to the lack of a disaster recovery plan.

Related Technology Needs:	**Related Business Goals/Objectives/ Directions/Opportunities:**	**Related Deficiencies:**
• Unattended Business Functions • Standards	• Manage Data and Information • Improve Processes • Establish Communication and Collaboration • Optimize Analysis, Assessment, and Improvement Practices	• Current plans address data only. Hardware, infrastructure, telecommunications, and mission critical operations are not covered. • No agency has ownership/ responsibility for Countywide planning. • Existing plans are dated and focus on ITS. • Significant downtime exposure.

Costs:			**Payback:**		
Low	**Moderate**	**High**	**Low**	**Moderate**	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Define mission-critical applications												
2. Determine minimum/preferred level of service												
3. Identify potential preparedness options.												
4. Review current status — level of resource availability												
5. Assess "gap" between needs and existing resources												
6. Model different scenarios												
7. Discuss and make decisions about level of service/approach												
8. Document business continuity plan with budget												
9. Gain approval												
10. Implement plan/access resources												
11. Test (ongoing)												

Costs	Year 1	Year 2	Year 3
Capital:	450,000		
Operations:			
Total:	450,000		

Capital Costs: Associated with analysis and planning.
Operations Costs: Expected out year costs related to implementation and support not yet defined.

OUTCOME MEASUREMENT

- Vulnerability and risk assessment
- Plans developed
- Alternative/backup resources identified/established
- Tested recovery scenarios

C. Architecture

Nine architecture strategies have been developed as part of the strategic technology plan. Architecture strategies address implementation and deployment of Web-based, integrated, and infrastructure technologies. Related to architecture strategy development particular areas of concern include the following:

- Lack of standardized infrastructure, hardware, and applications software
- Lack of standardized Web-based technology
- Lack of uniform technical approach when integrating applications
- Heavily customized software applications that are challenging to maintain
- Continuing proliferation of servers without consideration of capacity or placement
- Lack of design, plans, and related agreements around the deployment of broadband to achieve convergence and disintegrated telephony systems
- Lack of best practices supporting enterprise data management
- Disaggregated and nonstandard workflow between agencies, as seen in Procurement, Human Resource/Payroll, Finance/Accounting, and within Law, Safety, and Justice functions
- Dual Financial and HR/Payroll systems being operated

C1. Standardize technology including infrastructure, hardware, and applications software.

Timing: PHASE ONE	Difficulty: LOW-MODERATE

- To be successful in pending utilization, must achieve Countywide participation, building consensus related to particular technologies to be used.
- Will require time to phase in, as technology is phased out.
- Some agencies already have de facto standard technologies in use.
- Requires leadership, funding, and new technologies supporting standards implementation.

As made clear in the assessment process, the County lacks standards for many fundamental technology components. Standards are missing for such basics as cable, active electronics, hardware, and software. Other more advanced technologies, including voice, video, and wireless, are also lacking standards. This strategy is specifically defined to address and reduce the dozens of types of different hardware and software platforms in use, especially in cases in which the varying platforms support the same business functions.

Standards are important for two main reasons. First, technologies tend to be more supportable, meaning that the County will be able to operate technology for longer periods at lower costs. With longer lifecycles, there is ample opportunity to reduce the cost of maintenance. Second, the operating environment will tend to be more manageable and used by more agencies and personnel. In the marketplace, more people are typically trained on standard technologies, and these platforms connect and integrate with many more options, which again lowers the cost of the operating environment over the long term.

In reality, standards are often established by the market where popular products are embraced by the masses. This is not to say that the County must have just one standard for a particular technology, but the premise of managing fewer technologies versus many stands as an efficiency determinant. Having compatible technologies is also important. Infrastructure standards are needed in the areas of operating systems, databases, hardware, enterprise applications, and operating tools.

The County does not need to move to standards overnight. As old systems are replaced and new ones deployed, standard components may be implemented. Developing standards is not difficult. Essentially, those involved in development must arrive at a common understanding of business needs and then move to consensus related to defining the technology that may meet those needs. The notion of needing standards to address future technology deployment cannot be overstated. This is because standards generally can accommodate the majority of technology that is required within the County. Wherever possible, we recommend the County migrate to systems that are either standard in the marketplace or leaders in their respective fields (and as long as the systems are a good fit).

BUSINESS CASE

The business case supporting standards is based upon a solid cost-avoidance strategy. Many of the above-referenced standards are already de facto in the County as well as in the marketplace. Over the long term, standards will provide more technology functionality — for less money. The benefits of standardization, therefore, are directly tied to cost prevention and even reduction. The costs involved in operating nonstandard infrastructure may be reduced by replacing equipment (at the most opportune time), reducing the amount of maintenance required, and ultimately saving staff time. It should be noted that standardization does not require significant out-of-pocket costs to implement. Standards may be implemented as systems are replaced and new technology is deployed.

Standardization of infrastructure will ultimately reduce the total cost of ownership (TCO) of networked systems. While standardization may be vendor-neutral with a "best of breed" philosophy guiding the purchase of components, there are often benefits to standardization with a single vendor. With a more standardized model in place, the County will benefit in several ways. The area of infrastructure and active electronics is used to represent benefits.

Standards benefits include the following:

- Enhanced monitoring capabilities and quality of service. Similar devices using standard protocols allow for ease of management that can alert network administrators when connectivity is threatened, often before users even realize there is a problem. If standardized to a single vendor, specific monitoring applications such as CiscoWorks can be deployed — a further enhancement of monitoring capability.
- Easier firmware upgrades. With standard hardware and firmware in place, upgrades will be performed in a cost-effective manner, even from remote locations. This differs widely from the current model in which engineers must "track down" such upgrades and install on a case-by-case and manual basis.
- Less troubleshooting time. Poor cabling is a common cause of network connectivity errors and one that requires technicians to often spend lengthy periods of time testing and tracing connections. With standardized cabling, upgraded where needed, these types of disruptions can be minimized.
- Reduced staffing. A concentration of active electronics experience and knowledge that applies to all devices contained within the infrastructure will reduce the need for an assortment of technical skills related to different vendors.

The same benefits apply across the board to major components of hardware, software, and infrastructure. All of the areas represent the potential for reduced operating costs due to a more standardized approach to technology deployment.

Standardization should not necessarily involve the needless replacement of sound equipment for the purposes of common systems. A comprehensive cost/benefit analysis should be conducted in each instance, with the benefits of standardization factored into the process. Since many of the cost savings associated with this strategy are found over the long term and in reduced expenses, deliberate attention should consistently be applied to take account of these hidden savings.

The benefits and resource savings through standardization will outweigh the limited costs of implementation. This goal provides the County with both quantitative savings in the form of reduced maintenance costs and extended functional life spans as well as qualitative results such as performance improvements and greater support efficiency.

Related Technology Needs:	**Related Business Goals/Objectives/ Directions/Opportunities:**	**Related Deficiencies:**
• Standards • Planning and Design • Hardware Standards	• Manage Data and Information • Increase Revenues and Control Costs	• There is no detailed uniform methodology in place to establish standards. • As of yet, there are few enterprise-level standards guiding agencies in their efforts. • Critical standards are missing in the architecture, service delivery, operations, and management areas. • Standards are sometimes developed but are not enforced. • Few standards exist in the area of active electronics (hubs, routers, switches) • No formal standards exist (personal computers)

Costs:			**Payback:**		
Low	**Moderate**	**High**	**Low**	**Moderate**	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Identify potential alternative standards for each relevant technology												
2. Evaluate technologies' advantages, disadvantages, risks, budget, time frames												
3. Compare one to another												
4. Review against County business goals												
5. Discuss and select												
6. Implement standards												

Costs	Year 1	Year 2	Year 3
Capital:	225,000		
Operations:			
Total:	225,000		

Capital Costs: Associated with project to define standards.

OUTCOME MEASUREMENT

- Established standards in required areas
- Active adherence
- Oversight compliance

C2. Standardize Web-based technology used on the intranet, Internet, and extranet.

Timing: PHASE ONE	Difficulty: LOW

– Must achieve alignment among a number of groups already using other tools.
– Requires procurement of some products.
– Training and follow-up execution will be essential to take advantage of standards.

The growth of Web-based application deployment has been increasing over the past several years — a trend that will impact the County's intranet presence as it relates to providing information to internal employees, the organization's Internet site that provides Web-based data to the public, and the extranet, which is the Web-based interface for external business partners. So far, County Web sites and Web-based applications have been built using a variety of development tools (in various languages), including Microsoft Visual Studio, the ASP scripting environment, Cold Fusion, WebPutty, and others. As the County moves toward increased use of the Internet, it needs to standardize the technology being deployed. There are literally hundreds of software products available to support the development of Web applications. To remain efficient, the County must search out a set of products that best fit its needs, and then develop and maintain use of standard tool sets over time. Web tools are being evaluated as part of the system upgrade process, and will again be considered when enterprise systems are acquired.

As described elsewhere in this plan, there are three main categories of Web applications in use at the County: intranet, Internet and extranet. Although these are aimed at different audiences and support different applications, all three categories should make use of the same set of tools. There are four different tool sets that the County will need to consider for standardization. A number of them have already been identified and are in use, as shown in Table 35.

Table 35: Web Technology Tools

Tool Set	Current Environment	Potential Environment
Web Server	Microsoft IIS	• Microsoft IIS
Application Server and Development Environment	MS Visual Studio\ASP Cold Fusion WebPutty Arc Info Web tools	• Microsoft tools as basic platform (ASP, .NET). • Open/Java tools acceptable for departments that can provide their own support. • Evaluate market viability of WebPutty before setting as enterprise standard.
Content Management	None	• Market options include Stellent, Interwoven, and Microsoft Content Management Server. Continue with current selection process; emphasis should be placed on tools with standard features, low maintenance, and compatibility with the environment.
Enterprise Portal Tool	None	• Market options include Microsoft SharePoint Portal Server, Plumtree, Epicentric, and Viador. Select a moderately priced product that provides basic features, solid market share, and compatibility with other tools.

Today there are two primary technology directions from which to chose: the Microsoft .NET platform or the multivendor Java – J2EE platform. We recommend that the County select one of the two as its enterprise standard. The Microsoft environment may be the strongest option for the County. The organization already has substantial experience with Microsoft products, the products are reasonably priced, and the products provide many of the standard features needed. The recent additions to the Microsoft product line in this area (Content Management Server, SharePoint Portal Server) also appear in line with County needs. The Open/Java platform may also be acceptable, especially for development in agencies that have sufficient technical resources already.

Several other development tools are also in use at the County. The most recent addition is WebPutty, which is being used for development of an LS&J application. The product is compatible with Microsoft's .NET architecture and can produce functional systems with little effort. A major drawback of this tool set is the requirement of unique expertise. WebPutty should not be promoted to enterprise use until it has been proven in the marketplace and until the County decides that a substantial amount of development will take place using this tool.

Standards also need to be set for Web development, content management, and enterprise portal tools. In each of these areas, high-function and high-priced products are available, but there are also products that are more moderately priced that should provide most of the features needed by the County. Tools selected should be affordable, have a solid market share, and fit into the County's standard operating environment.

BUSINESS CASE

The standardization of Web technology development tools, content management applications, and enterprise portal suites will provide a variety of direct quantifiable benefits. Most of these benefits are tied to cost avoidance. These include the following:

Increased productivity of development staff. With a common development language and tool set, Web programmers will need to be proficient on only a single platform, thereby requiring less training and "ramp-up" time. Also, as a single platform is implemented, overall expertise and effectiveness with the established standard will increase at a faster pace than if developers were having to learn numerous different tools.

Less reliance on senior developers. Content and portal management tools will allow nondevelopers to safely create Web pages that can then be posted to the Web with less intervention from specialized development staff. These tools take much of the sophistication and difficulty out of the process of Web authoring and posting. Clearly, there will still be the need for quality assurance, but the skill sets for page development will be decreased, as will the cost. This could in turn lead to the greater use of less specialized and less expensive staff to achieve equal or greater Web-authoring results.

Greater project flexibility and less retraining. Standardized applications and platforms will allow for County developers to move between projects with less time needed for retraining. This will also create a larger pool of staff in the County with skill sets that can support all necessary Web pages, allowing for a more complete support environment. In the long term this will result in quantifiably less training costs and greater project support.

Reduction of licensing costs. Bulk licensing on a single product, as opposed to the costs and maintenance of several smaller licensing agreements, is generally favorable to the consumer. For example, the bulk purchase of Microsoft Visual Studio through current County agreements with Microsoft could lead to less per-seat expenses for the product.

Easier integration. As Web sites evolve and integration with other sites or with databases becomes necessary, a standardized platform will reduce the cost of garnering expertise either through consulting or training on the complexities and requirements of such business integrations. A single platform will allow for smoother integrations between applications due to increased effectiveness of internal staff, less complex data handling models, and the ability to reuse integration patterns and methodologies from previous projects.

The costs associated with this standardization of tool sets will include the purchase of the hardware, software, and related maintenance agreements, staffing, and training. A specific sampling of these potential expenses includes new high-end servers to be used for development of the code, licensing and maintenance agreements for Visual Studio.NET and Cold Fusion, increased training on the new applications for changes in the coding process (particularly in regard to the .NET architecture), and a content management system for handling versioning and application development process

issues. In comparison with the substantial savings related to standardization, the costs are relatively affordable. This strategy is considered to be an "easy win" for the County in terms of cost/benefit. While benefits are potentially significant, the costs to implement this strategy also add up. Capital costs are associated with hardware and software, and will continue to be required annually to add capacity. Ongoing costs will also be expended for staffing, training, and software.

The movement toward Web technology is a clear trend that will not stop. The action plan for this strategy is based on making rapid selection decisions, obtaining favorable licensing arrangements, and providing for a common tool set and platform for use by County developers.

Related Technology Needs:	**Related Business Goals/Objectives/ Directions/Opportunities:**	**Related Deficiencies:**
• Standards • Planning and Design • Internet/Intranet Access	• Improve/Expand Services • Optimize Analysis, Assessment, and Improvement Practices • Established Communication and Collaboration	• Mainframe data structures and system architecture do not provide an efficient way to publish "real time" data to the Internet. • The County intranet is rapidly expanding in a relatively unmanaged manner. • Little work has been done on the extranet with respect to infrastructure development. • Countywide development standards have not yet been established.

Costs:			**Payback:**		
Low	**Moderate**	**High**	**Low**	**Moderate**	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Define standard architecture tools												
2. Evaluate and select appropriate products, and negotiate favorable purchase agreements												
3. Purchase and install products												
4. Hire staff as required												
5. Obtain training (developers and users as required)												
6. Use for development and maintain products and environments												

Costs	Year 1	Year 2	Year 3
Capital:	340,000	150,000	150,000
Operations:	309,000	674,000	1,001,000
Total:	649,000	824,000	1,151,000

Capital Costs: Associated with hardware and software, and continue annually.
Operations Costs: Continue annually indefinitely for staffing, training, and software.

OUTCOME MEASUREMENT
• Selected standard tool sets • Utilization of tools once selected

C3. Standardize County technical approach for application integration.

Timing: PHASE ONE	Difficulty: HIGH
– Requires enterprise strategy (map) to be effective. – Agency personnel responsible for the systems must work together to achieve integration. – Accurate cost/benefit analysis and planning should precede integration. – Often consumes a fair amount of resources and time to connect systems.	

Whereas previous discussion has addressed systems management at a data level, this strategy addresses the need for integrating related applications. Currently there is limited integration between County systems. The task of integrating systems is challenging but also a high-payback proposition. A well thought out technical approach is needed to achieve integration, as is careful ongoing project management to guarantee success.

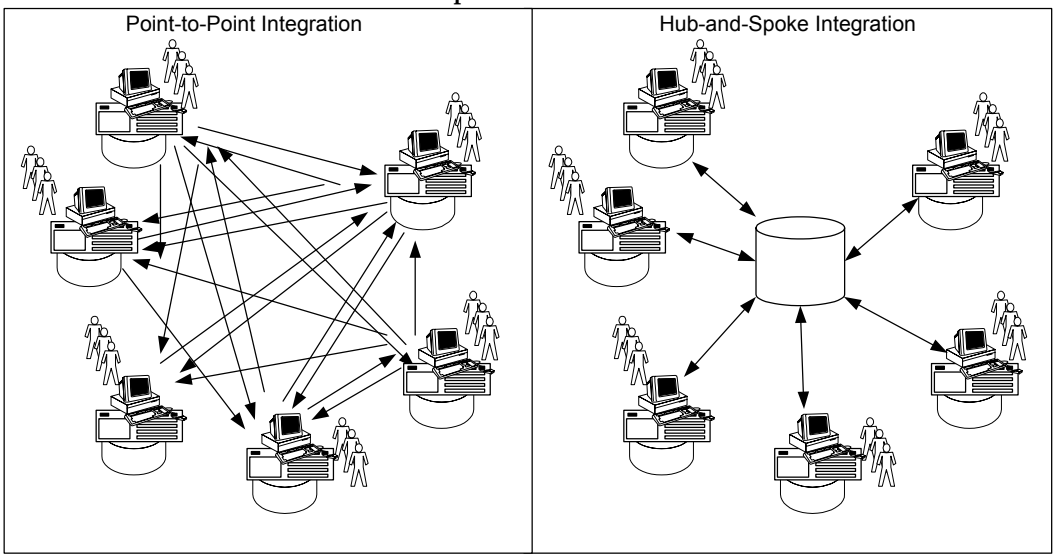
The County should establish a standard technical approach to use for integration. Integration technology is complex and potentially costly. A standard approach will directly reduce the risk of conducting unnecessary technical work and exposure to high costs.

Current examples of direct application of this strategy involve the Law, Safety and Justice areas as well as Financial and HR/Payroll applications.[19] In LS&J, the cumbersome data manipulation needed to extract meaningful information from the various systems is an inflexible and inefficient approach. Under a more integrated application model, the resulting gains in information sharing would be significant. In regards to HR/Payroll, a more integrated standard will allow for data extraction and reporting that simply is not reasonably feasible with the current mixing of PeopleSoft and MSA platforms. This in turn will allow the County to more properly manage its resources due to significantly enhanced information availability.

What integration does currently exist has been developed using point-to-point communications. By using this approach, custom connections have been programmed between each of the related systems. While simple to start out with, use of point-to-point integration eventually results a complex web of interactions, as shown in Exhibit 13. The alternate approach, called a hub-and-spoke architecture, uses an intermediary system or database as a central exchange of information. The central database approach is more reliable and has more ability to respond to changes because there are a limited number of connections to maintain.

[19] See expanded discussion of these areas on pages 183 and 187 of this document.

Exhibit 13: Point-to-Point vs. Hub-and-Spoke Architecture



Because each system communicates with only the one intermediary, there is increased opportunity to share data and standardize the way information is passed from system to system. A number of different technologies are available to achieve this integration, ranging from a staged data warehouse approach to a more real-time approach in which transactions are exchanged directly via an intermediary broker system. The market for integration software is full of competing and overlapping products. These products can be expensive to purchase and maintain. The County should study the products available to select those that best fit its needs.

The types of technology available to the County may be classified by the time lag involved in the exchange. In general, the shorter the time lag, the more expensive and fragile the interface. Table 36 shows the different types of integration, rated from slowest to fastest, and their characteristics. The right-hand column lists some examples of products in each category. Some of the examples of the products are listed, although products may fit into more than one category.

Table 36: Data Integration Technology

Type	Description	Sample Technologies	Representative Products
1. Point-to-point file transfer	Periodic sending of entire file between two systems	FTP, e-mail, mainframe utilities, ETL tools	Operating system vendor tools
2. Hub data mart	Validated data posted to sharable hub for approved users to access	Extract-Transform-Load (ETL) tools	Ascential DataStage Informatica Software AG EntireX
3. Asynchronous messaging	Message stored until receiver calls for it	Message-Oriented Middleware (MOM)	MQ Series
4. Synchronous access	Program-to-program communication via API.	Com, CORBA, J2EE, CICS	Vitria, Tibco, CICS
5. Shared database access	Applications directly access the same data; immediate and complete	SQL queries, heterogeneous DB query middleware	Native SQL, ODBC/J.D.BC, IBI, Nimble Technologies

The County currently has licenses to several of the integration tools, but they are not widely used. The most advanced product is MQ Series, IBM's messaging-based integration product. It receives messages from applications that it places in queues and delivers them to their destination. MQ Integrator is an add-on module that brings advanced features such as data validation and manipulation. To improve application integration the County will require tools from each of the categories listed.

The best integration approach will depend on the requirements of a particular situation. Guidelines should be developed to encourage selection of the most appropriate method that will provide the greatest long-term benefit and lowest total cost of ownership to the County. The County should also identify specific products to use for each class of integration. It may be in the County's best interest to identify a preferred vendor for each. Integration projects should be evaluated from an enterprise perspective to identify opportunities to combine projects, enable other users, and to establish hub-and-spoke approaches that will promote longer system life spans.

Funding for application integration needs to be considered in the process. Integrating systems requires that changes be made to several systems at a time. County technology projects, however, have been typically funded based on the needs of only one application. In the future, the County should define project charters to include integration with other systems, where appropriate, and include the funding necessary to make changes to related systems.

BUSINESS CASE

Integration should be made a clear priority at the County. Specifically aimed integration projects will be needed to resolve issues with existing legacy systems, but as new system projects are defined, each new project should also be evaluated for its integration needs, and integration should be funded and included in the defined project scope. Implementing integration technology can be expensive, but the improvements in workflow efficiency and reduction of point-to-point complexities generally pay for such technologies.

The County is currently spending hundreds if not thousands of hours creating and managing data and application integrations. "One study estimated that 30 to 40 percent of the time spent developing applications in a major enterprise was spent on 'data issues': identifying the sources of needed data, evaluating them, extracting and transforming data, dealing with data quality problems, and correcting software errors due to data-related problems. All of these activities would be completed more rapidly and at lower cost with an improved data design and integrated architecture."[20] Going forward, creation of a single interface would allow the County to eliminate one or more redundant systems, allow job functions and/or entire work groups to be redeployed more effectively, and eliminate problems from conflicting and unreliable data. If integration projects are performed without standardizing the technical approach, the County will face the cost and complexity of maintaining multiple, differing technical environments.

[20] http://www.intelligententerprise.com/000101/scalable.shtml

During integration, several different technologies may need to be implemented, but by matching the needs of critical projects with the particular solution, these situations may be managed reasonably. Integration projects should be overseen by the County Data Resource Manager and make use of the County Enterprise Data Model, in order to achieve the most out of the systems.

How can the return on integration be evaluated? The following areas of cost savings for the County should be considered for each system:

- Reduced cost of writing and maintaining point-to-point, single-use integration interfaces
- Decreased deployment times for new application integration projects, allowing the County to successfully implement enterprise applications in a shorter time frame because of shorter development cycles for the integrations
- The extended life of legacy systems through the integration of new functionality and data retrieval methods as opposed to completely replacing these older applications
- Operational system productivity gain (e.g., system response, load and processing time) as a result of increased efficiencies brought about by the integration
- Increased ability to handle currently unforeseen data and application mergers with other governmental entities in a cost-effective and timely manner

A particularly relevant example of the beneficial use of EAI is the Idaho National Engineering and Environmental Laboratory. This federal agency was able to make of use legacy VSAM and Adabas data through an EAI application that provided data and reports to users in a unified format through a web-browser interface. "Before this new application was implemented, users had to enter four different applications to have access to this data. Now users can run one report and, by following the hyperlinks, access information from the main applications."[21] An extensive ROI study was completed by the agency, which documented estimated break-even results in twenty-six months.[22] A comprehensive cost benefit analysis and EAI implementation enacted at the County may provide similar results.

Cost avoidance and investment return on this strategy will come in many forms. Significant examples of this include the reuse capability of application scripts and methods as well as the ability to use the same toolset for multiple integration projects. Most of the costs avoided are in the area of developer time and maintenance of the costly point-to-point application interfaces. The County should approach EAI knowing that the up-front costs of implementation may be significant, but the return on this investment will benefit the organization for years to come.

[21] http://www.intelligenteai.com/feature/010216/feat1.shtml
[22] Ibid.

Related Technology Needs:
- Data Management
- Planning and Design
- Improved Integration Between Systems
- Upgrade and Replace Dated Systems

Related Business Goals/Objectives/ Directions/Opportunities:
- Manage Data and Information
- Implement Technology Initiatives
- Improve Processes
- Integrate and Establish Partnerships

Related Deficiencies:
- The current tendency to create point-to-point integration between systems creates a complex web of interfaces that are difficult to maintain.
- Integration is significantly lacking around the County.
- There is no County policy regarding how systems should be integrated.
- TMB members identified lack of hardware and software technology as a major impediment to achieving integration.

Costs:			Payback:		
Low	**Moderate**	**High**	**Low**	**Moderate**	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Establish integration guidelines												
2. Evaluate integration tools												
3. Conduct cost/benefit analysis related to integration approach												
4. Select methodology for integration												
5. Develop plan for integration												

Costs	Year 1	Year 2	Year 3
Capital:	250,000		
Operations:			
Total:	250,000		

Capital Costs: Associated with cost/benefit analysis.

OUTCOME MEASUREMENT

- Developed guidelines and methodology
- Selection of integration tools
- Completed cost/benefit analysis
- Plan for integration
- Reduced redundancies and streamlined workflow

C4. Purchase and integrate top-quality commercially packaged software wherever possible and cost-effective — and with minimal customization.

Timing: PHASE ONE	Difficulty: MODERATE

- Requires a change of thinking to consider commercial products, and also to minimize customization.
- End-users must accept more standardized and simpler ways of performing a task, rather than automating historical processes.
- New approach demands learning new systems and aggressively managing vendors and implementations.

The County has a long history of developing customized systems. The results of this approach are seen directly in the number of legacy software systems operating. In contrast to the convention of building customized applications, this strategy looks to establish a new direction whereby standardized commercial packages are considered as a first option for deployment if such packages meet critical business needs.

For this strategy to succeed, a change in culture at the County is necessary. During systems evaluation processes, County employees must examine new ways of conducting business, rather than automating existing processes. The change of thinking will require a new approach for conducting systems analysis. For example, when examining a potential systems change, the process should be to first define required business workflow based on needs and industry best practices. Once requirements are defined, alternatives analysis may then be conducted, including an examination of "make versus buy" scenarios. Once alternatives are compared with one another, an objective decision may be made as to how to proceed. The evaluation process followed should generally follow a standard framework whereby advantages and disadvantages are considered, including life-cycle costs, benefits, and risks where relevant.

A fundamental reason why this strategy makes sense is that standardized software packages often provide more functionality and have less implementation risk in comparison with customized systems. The total costs of ownership are also commonly less than those associated with a comparable customized system. The importance of considering packages is particularly timely for the County as new systems are being contemplated. For example, packaged systems should be considered as an option for the following:

- Financial, Accounting, and Reporting
- Billing (if not able to use the enterprise system)
- Assessor (some applications)
- HR/Payroll
- Law, Safety, and Justice

It should be recognized that packaged systems will not always meet the needs of the County. Particular circumstances will demand customization, including when business requirements are unique, and corresponding packaged software functionality is not otherwise available. Specific functionality is the key determinant.

BUSINESS CASE

It is generally regarded as best practice to implement packaged software. This is especially true when business requirements are standard, as is the case, for example, with most Financial and HR/Payroll systems. In standard circumstances, consideration should first be given to purchasing packaged applications before considering the option to build an in-house system. A packaged solution may appear to cost more up front than building a solution, but total cost of ownership will be significantly lower over time.

Some of the primary benefits of prepackaged software include the following:

- Deployment time: A packaged solution most often decreases the absolute and elapsed deployment time when compared with building a system in-house.
- Customer focus: A packaged solution allows the organization to focus on the end-user rather than the programming.
- Cost-effectiveness: A packaged solution typically has a significantly lower total cost of ownership than a custom application, particularly when workflow changes, integration, and maintenance are considered over the long term.

In contrast, the challenges behind customization also often provide supporting arguments for selecting packaged software in lieu of programming. These arguments address the following:

- Maintenance: Customized systems are frequently a challenge to maintain.
- Dependence: Organizations become reliant on particular programmers and are at risk for loss of staff.
- Training: The costs associated with end-user and technical training are continuous and often high.
- Obsolesces: There is potential that the functionality provided by custom software will soon be provided by a vendor, therefore rendering the custom solution obsolete.
- Time constraints: Custom solutions typically require more time for problem resolution, both in implementation and over time as systems are maintained.

The cost/benefit analysis supporting procurement of packaged solutions must be examined on a case-by-case basis. To achieve benefits, it is assumed that software applications will be implemented properly. Generally, if the County's needs are similar to those that exist in other organizations, third-party software packages will suffice, often meeting over 80 percent of end-user needs. In contrast, when functions are unique, systems may be customized if done cost-effectively. One way to evaluate alternatives is, if packages only meet 80 percent or less of needed functionality, customization may be considered as a cost-effective option (if systems are built economically and reliably). This strategy specifically addresses one of the four deficiencies related to King County having procurement standards that are inconsistently applied identified in Governing.com's Government Performance Project 2001.

Related Technology Needs:
- Standards
- Data Management
- Improved Integration Between Systems
- Upgrade and Replace Dated Systems

Related Business Goals/Objectives/ Directions/Opportunities:
- Manage Data and Information
- Implement Technology Initiatives
- Improve Processes
- Utilize Cost-Reducing Technologies

Related Deficiencies:
- Numerous additional stand-alone databases have been developed for tracking data that are not maintained in the separate systems.
- Business analysis is not performed across agencies where it could be used to promote cross-agency system efficiencies.
- Business analysis and modeling is not occurring at sufficient levels to adequately support decision-making processes.
- Risk analysis is often left completely out of the picture.

Costs:			Payback:		
Low	Moderate	High	Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Define new approach to conducting alternatives analysis												
2. Discuss approach at BMC/TMB												
3. Select approach												
4. Document agreement												
5. Communicate new process to agencies												
6. Utilize new approach as required												

Costs	Year 1	Year 2	Year 3
Capital:	Costs will be absorbed internally.		
Operations:			
Total:			

OUTCOME MEASUREMENT

- Number of procurement processes considering third-party options
- Number commercial software products in use
- Number of customization projects; planned, underway, and completed
- Amount of standardized system integration in place
- Lower total cost of ownership

C5. Consolidate hardware around the County.

Timing: PHASE TWO	Difficulty: MODERATE-HIGH

– Requires significant expertise to prepare plan.
– Consolidation efforts will likely require some new equipment.
– Consolidation will take time and resources.

The County is presently operating over an estimated 300 servers and hundreds of additional printers and other peripheral devices. Because systems have been acquired in response to incremental needs, there has been limited analysis that has occurred in terms of managing overall capacity at a Countywide level. Particularly lacking has been analysis related to the potential for shared processing and storage.

Representative review of hardware reveals the potential for consolidation at numerous points across the County. This study observed numerous opportunities in at least eight agencies in which both servers and printers could likely be consolidated and eventually save funds and provide more capacity overall (more detailed study is necessary to confirm). Related to servers, this strategy focuses on centralized server hosting when possible, while maintaining an appropriate number of agency server bays at other locations as needed. Another area requiring analysis is in the area of printers since a move towards more powerful centralized printers may significantly lower the total costs of printing for desktop users. This strategy is related to the strategy of reorganization but may be pursued separately in order to address the benefits associated with optimizing capacity. Long-term, continuous hardware consolidation should be managed through an established comprehensive asset management function.

The costs and risks associated with operating unnecessary data centers cannot be ignored. Consolidation into more centralized areas of operations will not only allow for easier management, but will also help eliminate the storage of servers in areas that are not properly secured or where temperature controls are not in place. A number of the County's servers are housed in less than optimum conditions. In short, the array of data centers across the County is both inefficient and heightens the level of exposure to information and asset loss.

BUSINESS CASE

Numerous advantages exist to support moving forward with consolidation. Key among these are (1) centralized hosting providing efficient maintenance, administration, and security; (2) optimizing facilities investments that exist at central sites; and (3) providing shared backup and support. Perhaps most important is the long-term benefit of reducing the number of servers (possibly reaching an estimated 10 to 15 percent) and maximizing capacity by acquiring fewer and larger state-of-the-art boxes. At the County, capacity may be better managed, reducing the amount of time, money, and effort required to operate and maintain the environment.

Consolidation will save money in many ways, going beyond simply saving the costs associated with the purchase and maintenance of redundant systems. Other types of savings include the following:

- Reducing the number of support staff: Centralized servers and printers require less maintenance and monitoring, which can be done by fewer staff.
- Reducing the amount of network support: Fewer servers and printers means a less complicated network, making the domain structure easier to manage and configure.
- Reduced risk: Each County server running a Web server puts the County at a higher level of risk if the device is not closely monitored. Fewer Web servers means lower levels of operational risk and security support.
- Reduced application support: Properly scaled and configured, database and application servers can be consolidated, reducing the upgrade and patching process for these applications.

Future network redesigns may also be considerably simplified through consolidation. For example, the County's current plans to upgrade to Windows 2000 Active Directory will be impacted because consolidation of servers and elimination of superfluous domains will reduce the risk of problems during migration.

The decentralized model of agency and department computing has been repeatedly shown to be an ineffective way of managing such resources. The Gartner Group reports that "increasing the average number of users per server from 75 to 300 reduces total cost of ownership (TCO) by a whopping 44% and reduced LAN TCO by 15%."[23] Moreover, a recent survey by Computer Economics, Inc., showed that 69 percent of organizations that completed a consolidation project showed a favorable return on investment.[24]

There will be challenges in the implementation of this strategy. Depending upon the path selection, the out-of-pocket costs of consolidation may be significant, related to the timing and impact of moving application hosting and eliminating servers. For large agencies, control management and consolidation may not reduce the number of servers or support staff required to maintain such systems. This strategy assumes that many of the County's servers will also be consolidated somehow into reconfigured data centers. Both space and costs will be affected in this process. Further, numerous agencies have significant investments in hardware, facilities, and knowledge that the County will not want to lose. Finally, some agencies have a charter to protect their systems and data — which will come in the form of maintaining control over systems and privacy of operations. More analysis and planning will determine precisely where the best opportunities are located in terms of hardware consolidation. Once further analysis is conducted, it is likely that some short-term consolidations may occur, while others could be phased in over time as equipment ages and requires replacement.

[23] http://www.win2000mag.com/Artciles/Index.cfm?ArticleID=8455
[24] "Consolidation Project Survey," *Computer Economic, Incs* (November, 2001)

Related Technology Needs:
- Unattended Business Functions
- Standards
- Data Management
- Planning and Design

Related Business Goals/Objectives/ Directions/Opportunities:
- Manage Data and Information
- Improve Processes
- Increase Revenues and Control Costs
- Reorganize and Restructure
- Utilize Cost-Reducing Technologies

Related Deficiencies:
- There is no standardization of hardware and operating system.
- Decentralized model is not making best use of technology assets.
- The County does not have formal programs established for sizing, selecting, and ordering equipment.
- With multiple different technologies in use and the number of people involved, it is difficult to track and monitor exactly what protection exists.
- The geographic dispersion of the servers makes it difficult to maintain a security standard across the County.

Costs:		
Low	Moderate	**High**

Payback:		
Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Inventory servers												
2. Conduct detailed server-capacity study												
3. Assess applications that may be moved												
4. Define plan to determine how to move applications/servers												
5. Determine servers that may be eliminated or replaced												
6. Assess location and network connectivity												
7. Establish connectivity												
8. Acquire new equipment as required												
9. Consolidate servers, move applications												
10. Work with end-users in transition												

Costs	Year 1	Year 2	Year 3
Capital:		1,400,000	
Operations:			
Total:		1,400,000	

Capital Costs: Associated with hardware purchase and consolidation.

OUTCOME MEASUREMENT

- Physical move of servers to central locations
- Use of available capacity
- Lowered costs of long-tem operations on a per-unit basis

C6. Use broadband technology and a fully integrated PBX architecture as the future centerpiece to converge data, voice, and video transport.

Timing: PHASE THREE	Difficulty: HIGH

- No design or plan exists in the County to do convergence.
- Significant funding is required for start-up.
- Personnel and skills are lacking, including management, operations, and support.
- Uncertainty exists related to how to manage network to achieve maximum benefits.
- Must build operations capability either by outsourcing and/or hiring and training in house.
- Management is essential to provide organization and control to operations; as of now, management is not at level needed.
- Skills will need to be sought from outside the County organization.

Currently, the County is operating and maintaining the WAN, linking hundreds of LANs together between the agencies. In 2001, the County also began production and operation of the I-Net fiber-optic network. If properly designed, managed and operated the I-Net fiber network and existing King County WAN fiber optic network have sufficient capacity to handle voice, data, and video simultaneously, to serve existing as well as new applications and thousands of network customers cost-effectively. The long-term plan is to use broadband technology to the fullest extent possible. In this process, a converged network will be constructed to serve multiple applications and provide for a cost-effective delivery mechanism. Broadband fiber-based technology provides an excellent foundation from which to consolidate and operate the County's network.

This strategy directly supports the process of achieving network application convergence. Convergence is the concept for satisfying all voice, data, video imagery, and other applications, and all access, transport, and other service requirements over a single converged telecommunications facility. Convergence would consolidate the three distinct networks currently employed in the County (King County WAN, Voice, I-NET).

Changes to the County's current infrastructure will be required to implement broadband as the converged backbone network. While there are some limitations to the current ATM transport supported by the Marconi edge devices used in the I-NET, broadband is well positioned in a significant number of County facilities. As such, an effort should be undertaken to use the combined backbone network for as many of the current network services as possible. In addition to the ATM delivery, judicious allocation of the existing unused, or "dark" fiber will also allow the County to build a gigabit Ethernet delivery system for high-speed transport of data across the County. The ATM and gigabit Ethernet technologies can co-exist in the County WAN in order to leverage existing network resources.

The ATM platform lends itself well to voice transport as well as 10Mbit (and below) data transport, however the current Marconi ATM hardware used in I-NET has speed limitations, whereas the ATM hardware used in the King County WAN is scalable. The County could identify those users (at a department or division level) that historically use the most bandwidth, classify them as gigabit nodes, and use the I-Net and King County WAN fiber and gigabit Ethernet to serve these locations. Competition among first-tier providers (Cisco, Extreme, Riverstone, etc.) has resulted in favorable pricing for the carrier-class equipment that will be needed. Gigabit Ethernet, by design, can be implemented incrementally to provide significant improvements in bandwidth and performance as needed. The existing fiber WAN links owned by the County should be integrated in this process into the broadband network in a spur configuration that links connected agencies back to the broadband network for transport across the County.

a) Converged Network Architecture

Components of the broadband (King County WAN and I-NET fiber facilities) implementation include the following:

- *Transport Network Evolution* — The County will migrate leased facilities to the broadband network for data, voice, and video transport. Management of the network must include attention to growth, equipment-upgrade requirements, security, disaster recovery, training, change control, maintenance contracts, outsourcing, enterprise applications requirements (e.g. financial systems), and network services implementation.
- *Network Security and Fraud Protection* — The network will be designed to prevent unauthorized access to network resources and data. Security-screening techniques will be used to allow access to systems and applications as required but to disallow access by all unauthorized uses.
- *Scaleable Bandwidth* — The network will be designed for scalability to meet bandwidth demands.
- *Standards Based* — All transport network devices will be based on industry standards. The standards and specifications will be documented and made available for service level management and agreements.

b) Converged Network Operations

Successful operation of a broadband network requires a group of qualified personnel trained with, and in possession of, the necessary tools to efficiently manage the converged network. A broadband network has significant potential and benefits. A broadband network requires a higher level of management and monitoring in relation to its performance and utilization than is currently in place. At a minimum, management considerations should include the following:

- *24x7 passive monitoring of traffic on all segments.* Performance standards need to be determined and monitored with special attention to utilization of bandwidth. Staff needs to be able to interpret this data and make changes as appropriate up to and including equipment and/or software enhancements or replacement.

- *Scheduled preventative maintenance on all key components.* This may require an inventory and possible adjustment of core equipment to insure n+1 redundancy that allows for preventative maintenance to be conducted.
- *Live coverage by either dedicated County staff or outsourced to a qualified entity.* If such is not possible or is deemed unnecessary, a provision needs to be included that automatically pages on-call personnel during "nonstaffed" hours. The system needs a level of sophistication that continues to page and escalates, as defined by severity, until response is received.
- *Management of outsourced service providers.* A written service-level agreement with the Service Providers (AT&T, Verizon, and others) is required to access vendor facilities where equipment resides. This agreement needs to address space, power, environmental, and maintenance-related issues with clearly delineated responsibilities and specific restoration criteria.

The broadband network will enable the County to start taking advantage of the convergence of voice and data. Introduction of this fundamental technology change will enable the County to cost-effectively deploy new application and service-delivery capabilities that do not currently exist. While there are important considerations related to the deployment of active electronics (necessary to use the broadband network for voice services), the broadband network will position the County to benefit from advanced convergence technologies. A simple example of convergence involves replacing the Centrex phones with telephones that are served on the Ethernet WAN. The County's existing Centrex contract with Qwest cost's exceed $2 million per year.

As the County integrates its WAN services across the broadband network, every LAN port will have the capacity to become an access point for voice services via IP telephony technology, namely Voice over IP (VoIP). VoIP is discussed in tandem with broadband because broadband connectivity is critical to the implementation of this new technology. While innovative in its design, VoIP has some significant design and installation considerations. The County's current broadband network provides a suitable transport mechanism for VoIP while use of leased line WAN connections for this technology may, upon close review, be found to be insufficient in bandwidth. As the County reviews VoIP options and vendors, it will be important to consider cabling requirements since these can negatively impact the quality of VoIP communications. In particular, use of VoIP should be limited to those locations that are cabled to exacting standards as set forth in TIA/EIA 568. Gigabit Ethernet switching could also be a foundation for VoIP in those areas where it is fiscally prudent. In those areas where the Telco provider central office services (Centrex) support staff for voice and leased lines for data, a consolidated VoIP solution could potentially save significant dollars (especially in those facilities where inter-County telephone calls are typically toll calls).

VoIP applications could be implemented as soon as standards are developed, a set of procurement documents crafted, and services acquired. The technology to utilize broadband as a County "telecommunications utility" is available now. The implementation of this application will place additional demands on the network

routers and switches and will need to be factored into any new network design and hardware upgrades. The integrated network will allow King County to migrate to VoIP where prudent or harvest the investment in legacy PBX systems were VoIP is not prudent.

The bottom-line focus of this strategy will be to develop a migration path that capitalizes on voice connectivity between current PBXs using the broadband capacity while looking toward an IP-based transport for future applications.

While standardization of voice-switching systems is desirable, the County should also recoup its investment in Nortel and NEC systems. From a financial perspective, it is considered impractical to force consolidation around a single brand at this time. A migration over time to a standard system is the best way to allow the county to use the existing hardware and reduce management and operations expenses where the business requires new features. Recent industry technology standards enable networking of disparate brands of voice-switching systems. The move to an integrated network will position the County to select and migrate to a switching system standard while allowing continued use of its legacy systems investment.

In regards to voice traffic, an integrated voice-switching system will combine the County's disparate systems with a common dial plan, provide redundant access PSTN (public switched telephone network), and provide consistent features and functionality. The purpose of this strategy is to reconfigure systems to directly deal with voice system risk mitigation, E-911 caller safety, deteriorating switching platforms, and to control maintenance costs, and provide expanded and new services

The integrated voice systems network design will enable expansion and distribution of services from existing voice switches and avoid proliferation of additional switches. The integrated voice-switching network will be based upon the network transport facilities obtained from the centerpiece broadband network, and will replace the County's existing voice-switching systems network transport (which is primarily via leased circuits obtained from local exchange carriers). Exploiting the broadband network to serve systems needing replacement as remote sites of healthy service platforms will mitigate obsolescence of existing voice-switching systems.

The preliminary steps and critical path for this project will encompass the following tasks:

1. Complete an inventory of all WAN equipment, documentation and schematics.
2. Perform a full assessment on current WAN functionality, responsiveness and usage.
3. Inventory and review all County phone charges related to Centrex and leased circuits.
4. Review current service level agreements with WAN and phone service providers.
5. Identify the current and expected WAN bandwidth needs of each agency.

Once these steps have been conducted then formal design plans, cost benefit analysis studies, system selections and pilot implementations can commence, as outlined in the Gantt chart at the end of this strategy.

BUSINESS CASE

Convergence is being successfully and cost-effectively deployed in today's marketplace. Citing recent trends, a Cisco white paper details that "a recent META Group study found that 26% of global 2000 enterprises are already in the process of migrating to a converged network." The paper further states, "Convergence has progressed to the point that most organizations should seriously evaluate its role in the future of their networks." Cisco goes on to say that "moving to a converged network can substantially reduce an organization's total cost of ownership for its network, and reduce the ongoing costs required to maintain and upgrade the network . . . through the elimination of multiple sets of infrastructure, simplified administration/maintenance, and consolidation of IT staffs." A high-level list of benefits from this report is provided in Table 41.[25]

Table 37: Convergence Benefits

Business Empowerment	• Reduction in network infrastructure costs • Reduction in staffing and administration costs • Reduction in facilities costs
Enhanced Personal Productivity	• Unified messaging • Personal communication assistants • IP video solutions • IP phones and IP soft phones
Improved Workgroup Productivity	• IP video solutions • Collaboration tools
Enhanced Customer Care/Responsiveness	• Multimedia contact centers • Collaboration tools

The implementation of broadband technology provides the County with new opportunities to take particular advantage of in the short term. Two are particularly noteworthy, including the potential elimination of leased lines and the reduction of local access services. Related to leased lines, a physical inventory of all the lease lines and an audit of the invoices have a high likelihood of revealing unused or unneeded private leased lines. These unused or unneeded lines could stem from lines that were used at some time in the past and then were disconnected or from duplicate lines that serve the same facility. Further, organizations frequently find that the carrier providing the service fails to remove the service from invoices, and through changes customers are able to recoup significant expense by reconciling bills.

[25] Cisco Systems, "The Strategic and Financial Justifications for Convergence," [electronic white paper]. Available at http://www.cisco.com/offer/tdm_home/pdfs/iptelephony/roi.pdf

Convergence will provide the County with centralized management and coordination of data, imagery, and voice. While the costs of such endeavors will be high, the returns on a well-planned and properly managed move toward convergence will bring a high return for the County. The benefits in efficiency and decreased lower cost of ownership found in convergence mark this strategy as one that can enable the County to be more productive at considerably reduced expense over the long term. Merrill Lynch's convergence savings can be summarized in the question put forth by their CTO before beginning the successful project, "Indeed, before he'd even plugged in the first VOIP handsets, he saw a way to cut Merrill's phone bill. 'I'm paying for the voice circuits to carry phone calls around the block or around the world," McKinley says. "And I've paid again to put in this great data network, which has grown huge in order to handle this gusher of information. Can't I have some convergence and start moving my voice traffic over the data network?'"[26] The cost savings for this project amounted to a 25% reduction in phone charges.[27]

The introduction of broadband convergence not only leads to greater cost effective communication but also enables expanded functionality of current and future applications to be utilized. In the words of the leaders on the Province of Alberta's SuperNet broadband project, "We heard it at meeting after meeting, time and time again, 'If only we had the bandwidth, we could do this. We don't have the bandwidth to do it'"[28] With added bandwidth between governmental entities and with business partners, the effectiveness of those applications that require streaming data (such as audio and video conferencing) or large file transfers (e.g. GIS, CAD and graphic design collaboration) can be significantly improved.

The long-term strategy also calls for a thorough examination of the use of Centrex. The migration toward standard telephone systems in all locations will simplify demands on the support organization. The County may also find that premise-based telephone systems are less expensive than the Centrex service. The reduction of Centrex services may occur as a result of an audit of such services that will likely provide a path to reduced operations. The methodology for this audit should include a physical inventory at the sites that use Centrex and then a comparison of such site utilization against received invoices. Experience has shown that, when lines are moved or disconnected, the billing records do not always track the actual Centrex services being used.

The initial benefit of PBX integration will be a reduction in the current costs paid annually for leased circuits. It is estimated that the bulk of these services will be moved to the broadband network, which when netted against the voice-switching factions pro rata share of the broadband network costs, could yield savings between $250,000 and $500,000 per year (with savings to be confirmed through further detailed analysis). Another primary benefit of an integrated voice systems network design will be the option of expanding and networking existing proprietary voice-messaging systems rather than purchasing a single replacement system for the centralized and obsolete Pulse Point voice mail system. Such a design will reduce catastrophic single point of

[26] "Merrill Lynch Phones Ahead," *Fast Company*, October 2001. Available at http://www.fastcompany.com/online/51/merrill.html.
[27] Ibid.
[28] Cisco Systems, "Province of Alberta Success Story," [electronic white paper]. Available at http://www.cisco.com/warp/public/779/ibs/vertical/publicsector/

failure risks and leverage existing legacy system investments. A key benefit of this move will be risk reduction and establishment of new disaster recovery options. The integrated voice-switching network will have alternate PSTN access points to minimize the currently dominant dependence on Qwest's Seattle 06 central office.

The cost of optimization of the voice-switching network is tied to three phases of work. The first phase takes the preliminary steps outlined in the previous section where a complete, detailed inventory and assessment will be conducted. This work will provide the County with the clear benefits of moving forward with additional investments. The second phase will provide a detailed design to integrate voice systems into a finely tuned distribution system. The third is full-scale upgrading and implementation of the design, whereby network facilities and equipment will be upgraded, reconfigured, or replaced. The costs of the first preliminary study phase is estimated to be about $200,000. The second phase of design and development of specifications for procurement is estimated to be in the range of $100,000 to $150,000. The costs of the third phase are dependent on the anticipated agreed upon and specified design, and are indefinite at this point. When comparing the above-introduced benefits to such costs, payback may be achieved within several years if systems are designed and operated in a proper manner.

Related Technology Needs:	**Related Business Goals/Objectives/ Directions/Opportunities:**	**Related Deficiencies:**
• Proactive Service Delivery • Neglected Technology Management Functions • Improved Integration Between Systems • Telephony • Internet/Intranet Access • Improve voice communications with the public and county employees.	• Improve/Expand Services • Manage Data and Information • Implement Technology Initiatives • Integrate and Establish Partnerships • Optimize Analysis, Assessment, and Improvement Practices	• Delivery area for the WAN is limited. • Bandwidth on T1 circuits is fixed and not easily upgradeable. • No agreed infrastructure cable standards have been established. • King County's voice-switching systems have evolved into a disaggregated collection of disparate, distributed systems. • ATM is a solid transport vehicle for voice when such transport is at a DSx basis (i.e., T1 or DS3); however, it is not the correct vehicle for VoIP and not the preferred transport for IP. • Telecommunications management is generally fragmented around the County. • Services are not managed consistently or from an enterprise perspective. • Several of the PBXs are at the end of their life cycle. • The centralized voice mail system appears at capacity without an option for hardware expansion or software upgrade. The current voice mail system is 14 years old and has been determined to be "nonserviceable" by its vendor. It is tentatively scheduled for replacement.

Costs:			Payback:		
Low	Moderate	**High**	Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Define and acquire skills												
2. Assign responsibilities												
3. Inventory WAN, PBX and I-Net equipment and operations												
4. Inventory Centrex and leased line costs												
5. Review current SLAs												
6. Define agency needs												
7. Develop needed standards												
8. Determine operations/management model												
9. Establish SLAs and management reporting functions												
10. Establish quality assurance function												
11. Identify alternatives												
12. Conduct cost/benefit analysis												
13. Develop a design and plan												
14. Begin prototyping unified PBX and network												
15. Test												
16. Confirm benefits/viability												
17. Expand capabilities/migrate to converged backbone												

Costs	Year 1	Year 2	Year 3
Capital:	350,000	1,290,000	2,530,000
Operations:		325,000	552,000
Total:	350,000	1,615,000	3,082,000

Capital Costs: Associated with project planning, hardware and software purchases, and contracted assistance.
Operations Costs: Project staffing requirements and training.

OUTCOME MEASUREMENT

- Broadband architecture defined and implementation begun.
- Infrastructure in place and tested
- Personnel skills and know-how available and managed (whether internal or external)
- Connected nodes utilizing capability with satisfied customers
- Service-level agreements in place
- Service-level management reports available.
- Operating center with 24x7 performance
- Return on investment
- Operational, integrated voice-switching system
- Uptime reliability
- Lower costs of operations

C7. Institute Countywide best practices for enterprise data management.

Timing: PHASE ONE	Difficulty: MODERATE-HIGH

– New function requires support to be successful.
– Requires understanding of enterprise business model, processes, and systems.
– Requires new hire and/or skill sets to establish and continue data management.

The two most pervasive data problems identified by the agencies surveyed during the planning process were "improve integration between systems" and "eliminate duplication between systems." The challenge of improving data management is significant, and the County is not alone in this area. Data problems are common in large and complex operations. There are a number of actions, however, that should be initiated to improve the situation:

- Create a new position of County Data Resource Manager responsible for monitoring and promoting the proper use of data.
- Define a County data policy that encourages data sharing and sound data management practices, including accountability for data ownership and stewardship.
- Develop high-level enterprise data architecture to use as a template to guide data management efforts.
- Use analysis and modeling techniques to understand, document, and improve County processes and databases, and standardize techniques used across the County.
- Oversee County system projects to help achieve better use of data.

Best practices may be used to make improvements in data management. The best-practices approach is centered on two principles: (1) develop an architecture to guide systems development and (2) establish accountability for its use. The effort should focus on the most critical data items. As a part of this Strategic Technology Plan project, numerous critical data items were identified. These data elements are fundamental to improve the County's ability to operate more efficiently. For illustrative purposes, definitions of each data type are shown below in Table 38. The County should use this list as a starting point to begin defining standardized best practices for data management.

Table 38: Critical Data Types

Data Type	Description
Information	Where and how to find information, who owns it, what it is
Account/Budget	Financial accounts and their associated balances and budgets
Service	A service provided by the County to its constituents and partners
Law/Regulation	Laws and rules of and related to the County
Project	A County project that uses people, equipment, money, etc.
Employee	A person who works for the County (salaried, contract, or other)
Legal Subject	A person of interest to County Law, Safety, and Justice functions
Partner	Business or government agency that deals with the County
Facility	County buildings, roads, compounds, etc.
Parcel	A parcel of land in the County
Equipment	Devices, vehicles, computers, etc. managed by the County
Constituent	A person who is a recipient of County services

As a central part of best practices, an enterprise data model will be needed to identify the data types most important to the County. Typically there are several computer systems connected to each data type, and the model will show the most important relationships between the data types. Once defined, the relationships can be used to identify key integration points between systems. For example, best practices data modeling will prove that an interface could be developed between the County's parcel management database and its facility management database. Interfaces and integration are addressed in a later strategy providing further support for sharing data around the County.

BUSINESS CASE

Data management is a high-payback proposition. If done well, it is likely that the County can avoid large, expensive data integration projects, and avoid the duplicate cost of implementing different versions of the same system. Business processes will function more efficiently when connected through a smooth flow of information. When data is not coordinated or shared, entire work groups may need to be created to resolve the disparate and broken processes that result (as is the County's situation today). Data resource management is a necessary function to lead the County toward integration. It is possible that by adding one –to three centralized data management professionals, the County will potentially save multiple other positions and avoid the cost of unneeded projects and countless amounts of hours spent working with unnecessary processes.

Enterprise modeling will play an integral role not only in planning and designing data warehouses but also in coordinating technology efforts throughout the entire enterprise. A document published in *The Data Administration Newsletter* speaks to the benefits of best practices through an enterprise data model (EDM).

Some of the key benefits are described as follows. The EDM —

- Allows the entity to develop an enterprise perspective. One of the key purposes of the modeling effort is to develop "common threads" and compile "cross-functional, common definition[s]" of entities within the enterprise, thus making the model easier to read for a broader audience.[29] This means that more stakeholders may better understand how other individual business units use information, and then be positioned to identify opportunities to reduce redundancies, capitalize on others' efforts, etc.
- Allows the entity to develop and define strategic information needs. The model helps to isolate data from specific contexts and frame it within business terms that "will support growth and new initiatives." By defining entities in business terms, opportunities may be identified that support and offer options for success to the business.

[29] Long, Kathy, "The Enterprise Data Model: A Key Ingredient For Successful Data Warehousing," *The Data Administration Newsletter,* Issue 5.0, June 1998.

- Supports the development of business data stewardship. The subject matter experts who become involved in the modeling effort will become the "strategic data stewards" responsible for the "accountability, control, shareability and quality management of enterprise data." The data stewards represent those people most familiar with the data and are not limited to technology personnel. With stewardship, the modeling effort will naturally account for the business perspective and will help define ownership of data.

The above benefits will provide the enterprise with a means to tie together its processes and improve data tracking. The development of an EDM will also benefit any data warehousing efforts that the County undertakes. Two key benefits are as follows. The EDM —

- Provides the basis for a warehouse atomic-level data store. Most warehouses designed today consist of a central repository of normalized data that is referenced by multiple functional data marts. In this context, the EDM provides the blueprint, and referencing the EDM will ensure that the atomic data store is built on a forward-thinking data model and with a solid understanding of cross-functional entities.
- Provides support for developing a warehouse release strategy. Because EDM defines the integration points between primary entities, provides insight into the complexity of information, and supports the gap analysis between strategic information needs and current availability, it assists with the development of a phased implementation and long-term data management effort.

Cost avoidance and reductions related to this strategy are numerous and include the following: reduced data management costs, reduced operating costs, reduced report generation and distribution costs, reduced system costs, and reduced distribution costs, among others. For example, a review of the Government Performance Project conducted by *Governing* magazine revealed praise for enterprise data management efforts undertaken by other counties, cities, and states participating in the study. Technology Award winners included a governing entity that developed a robust data management system and warehouse to store and analyze tax information for its citizens. The system allowed the governing body to review nearly 260,000 taxpayer accounts in a few months, which, it is estimated, would have otherwise taken 68 years to do with its previous processes and systems.[30] Such an operation would not have been achievable with the County's data structure.

The impact of poor data management can often be difficult to ascertain because manual reworking of data many times takes place during the report preparation process. As one vice president states, ""Data quality has remained a closeted issue in IT because there's little visibility at the management level that the problem is occurring. Generally, data would have gone through many days of manual rework before it's presented in a report to senior management." [31] However, the impact of such mismanaged data clearly hits the

[30] Diane Kittower, "Technology Award Winners: Putting Technology to Work." *Governing Magazine* (October 2001).
[31] Beth Strackpole, "Wash Me, " *CIO Magazine*, (February 15, 2001). Available online at http://www.cio.com/archive/021501/data.html

County's bottom line, in the words of one high-ranking IT specialist, "Our studies in cost analysis show that between 15 percent to greater than 20 percent of a companies' operating revenue is spent doing things to get around or fix data quality issues"[32]

With further case study, the potential impact on the County's operations from use of an enterprise data model may be analyzed from both qualifiable and quantifiable standpoints. The action plan for this strategy is centered on assessing the need for a data resource management (DRM) organization, implementing standards, and developing a data model for the County. Assessment will include a study of the costs and benefits related to establishing DRM. During the analysis, the County may find that data warehouses are needed. Success in data management will also require the cooperation and assistance of agency staff to implement desired improvements.

Related Technology Needs:
- Data Management
- Improved Integration Between Systems
- Planning and Design
- Agency Coordination

Related Business Goals/Objectives/ Directions/Opportunities:
- Manage Data and Information
- Implement Technology Initiatives
- Optimize Analysis, Assessment, and Improvement Practices

Related Deficiencies:
- There is no Countywide data planning occurring outside of certain agencies, particularly GIS.
- There is a lack of awareness of the concept of data ownership and stewardship.
- Without standards and a business-oriented data model, Meta data is hard to obtain.
- Data standards are agency specific and used inconsistently.
- Different standards and designs have been used over the years related to database design and functionality.

Costs:			Payback:		
Low	Moderate	High	Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Define enterprise data management requirements												
2. Develop policies and standards for data management												
3. Develop data model framework												
4. Identify alternatives for moving forward												
5. Analyze alternatives												
6. Conduct cost/benefit analysis												
7. Determine approach for enterprise data management												
8. Develop plan and define EDM methodologies												

[32] Ibid.

Costs	Year 1	Year 2	Year 3
Capital:	500,000		
Operations:			
Total:	500,000		

Capital Costs: Associated with cost/benefit analysis.

OUTCOME MEASUREMENT

- Cost/Benefit analysis
- Defined approach
- Established data model framework
- Framework utilized as a foundation to integrate systems and guide development efforts
- Integrated systems through a common data language
- Redundancies eliminated

C8. Design and implement a common architecture to integrate workflow between Law, Safety, and Justice agencies.

Timing: PHASE THREE	Difficulty: HIGH

– Despite closely aligning business workflow, agencies have been operating disaggregated processes for years, which will be difficult to change.

– Complex detailed workflow – is challenging to realign

– Separate agencies with different centers, are operated by separate the elected officials and judges.

– Scope of multiple systems is large, so that significant change will demand lots of elapsed time, labor resources, and funding.

– Little understanding or study has occurred over the years.

The LS&J agencies work together on a daily basis. Paperwork moves by the thousands of pages while records pass from the sheriff to the prosecutor and jail, from the prosecutor to the courts, and frequently back again to the jail. Neither the technologies nor the processes used to support these agencies are standard. Much of the technology resides on the mainframe and is customized.

The current level of workflow between agencies is cumbersome and inflexible, and it is clear that future efforts need to focus on streamlining the handling of this data. The County could spend millions of dollars in an effort to move to a sophisticated paperless environment, but because of the costs and risks involved, this is not considered to be a near-term or risk-controlled option.

A more viable option is to implement integrated workflow through a well-designed multiagency system. This may be accomplished by streamlining workflows; improving data management; and implementing simple, standardized, and integrated functionality. This approach will effectively establish links between agencies aligning data, personnel, and information processing. Along the way, it is assumed that fewer documents will be produced as more data is managed in an automated, rather than manual, format. It is possible that lower-cost, standardized systems may be used as a primary component to support the new architecture. The gist of this strategy focuses on integrated design and automating the incremental workflow within and between agencies. This "step-at-a-time" approach will keep costs and risks relatively low.

This strategy is consistent with the objectives of the County's LS&J Integration Project, which has defined integration as being needed on at least three different levels, including (1) point-to-point data sharing; (2) operations, and (3) consolidation of manual activities. The simple integration solution promotes application migration over time and makes the most sense for the LS&J arena because it is the most complete, practical, and cost-effective. The integration effort will be supported by a set of standard development tools that will be used by the various agencies involved. The next steps in the integration process will be to study workflow, develop requirements, acquire tools and possibly applications, and then prototype new records workflow. Implementation of this strategy may include purchasing and implementing software applications. Packaged software may be implemented either within agencies and/or between agencies.

BUSINESS CASE

Currently, the County has an LS&J integration project underway, being conducted by a BMC subcommittee. As a result of this work, 10 quantitative and 12 qualitative opportunities have been identified to improve and streamline existing operations. Identified opportunities focus on major business functions. In addition, quantitative opportunities are defined to achieve time savings associated with activities such as jail bookings and classifications, court calendaring, and criminal history research. In total, over 5,400 hours per week may be affected or reduced. Qualitative benefits have been identified in such areas as electronic case filing, warrant management, and reporting. Quantitative and qualitative factors are listed below in Tables 39 and 40, respectively.

Table 39: LS&J Integration — Potential Quantitative Opportunity

Opportunities	Assessment Alignment	Business Alignment	Primary Beneficiary
1. Referral Filing: Electronic submission of police referrals	High	High	Prosecutor
2. Prosecutor Case Filing: Improved creation of filing booking documents	Medium	High	Prosecutor
3. Jail Intake and Booking: Electronic submission of booking documents	Medium	Medium	DAJD
4. Jail Classification: Improved access to required classification information	Low	Low	DAJD
5. District Court Processing: Electronic submission of police information	High	Medium	District Court
6. Court Calendaring: Coordinated and computerized court event scheduling and management	High	High	Multi
7. Public Inquiry Response: Web availability of public court information	Low	Medium	Multi
8. Criminal History Research: Improved access to criminal history information	Medium	Medium	Prosecutor
9. Case Results Update: Electronic sharing of updated case status and information	Medium	Medium	Multi
10. Jail Disposition Management: Improved access to required program eligibility information	Medium	Medium	DAJD

Table 40: LS&J Integration — Potential Qualitative Opportunity

Opportunities	Assessment Alignment	Business Alignment	Primary Beneficiary
1. Public Safety Info Portal: Make complete public information available to the public	Low	Medium	Sheriff
2. Police Investigation Sharing: Develop a consolidated source for current interjurisdiction investigations	Medium	High	Sheriff
3. Consolidated Law Enforcement History: Make comprehensive criminal history available in the field	Medium	High	Sheriff
4. Updated Referral Status: Share information about referred cases	High	High	Sheriff
5. Inmate Status Reporting Improvements: Improve ability to develop new/ad hoc reports about inmates	Low	Low	DAJD
6. Prosecutor's Paperless Case Files: Support the development of electronic prosecutor case files	Medium	Medium	Prosecutor
7. Electronic Case Filing: Electronically receive, sign, and initiate court cases	Medium	Medium	Multi
8. Improved Warrant Management: Timely and direct warrant information access and management	Low	Medium	Multi
9. Improved Court Status Reporting: Improve ability to develop new/ad hoc reports about court cases and status	Low	Low	Multi
10. Consolidated Inmate Management: Improve ability to manage inmates through consolidated functions	Medium	Low	DAJD
11. Health Service Coordination: Share inmate information with health services to improved inmate care	Low	Medium	DAJD
12. State Correctional Data: Import/export correctional data with state	Medium	Medium	DAJD

Because of the need for integration within the field of Law, Safety, and Justice, numerous other counties throughout the United States have spent considerable time and resources to integrate workflow. The costs have ranged widely, from a low of $5 million in Sacramento County, California, to a high of $30 million in Marin County. The less expensive projects have involved using middleware in the integration process, while more expensive projects have expanded from core integration to developing significant customized functionality.

Given the opportunities targeted by the County, the costs of deployment may be roughly estimated to be in the low eight-figure range. When benefits are weighed against such costs, payback could occur within 10-plus years based upon early estimates of weekly hourly savings. For projects of this size, this kind of financial payback is considered substantial. Given the amount of work occurring nationwide in this arena, more feasibility information is becoming available about these kinds of projects and may be used as a basis for justifying going forward with this strategy. Further analysis is considered necessary to pinpoint the areas in which highest payback may be achieved.

Related Technology Needs:
- Law, Safety, and Justice

Related Business Goals/Objectives/ Directions/Opportunities:
- Manage Data and Information
- Utilize Planning Activities
- Integrate and Establish Partnerships

Related Deficiencies:
- Ongoing costs related to maintenance are considered high relative to the market.
- Few staff are currently available to support aging software systems.
- There are concerns about the long-term stability as software gets older and is not updated.
- County programmers supporting LS&J systems are retiring soon; availability of skilled mainframe programmers is being questioned.

Costs:			Payback:		
Low	Moderate	**High**	Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Study records and workflow between agencies			■	■								
2. Analyze potential opportunities for connectivity			■	■								
3. Define "gaps" between current and potential new processes			■	■								
4. Conduct cost/benefit integration analysis				■	■							
5. Determine priority points automation/reengineered processes				■	■							
6. Develop detailed plan/design				■	■							
7. Develop proof-of-concept					■	■	■	■				
8. Implement permanent workflow connectivity								■	■	■	■	■

Costs	Year 1	Year 2	Year 3
Capital:	Cost estimates not available at this time. Estimates may be made once detailed requirements are defined and analyzed.		
Operations:			
Total:			

OUTCOME MEASUREMENT

- Detailed workflow definitions developed
- Feasibility study related to integration confirming benefits
- Confirmation that standardized technology is viable
- Proof-of-concept system automating links between agencies
- Workflow and systems integration reducing manual work steps
- FTE reduction

C9. Implement a standardized integrated portfolio of enterprise Financial and HR/Payroll applications.

Timing: PHASE THREE	Difficulty: HIGH

- Multiple agency business models require significant reengineering.
- Cultural resistance to change is expected to be significant.
- Little experience is available related to project management on the scale needed.
- Significant funding is required.
- Vendor implementers' track records are mixed at best.

The County operates numerous primary business systems that serve all agencies' numerous financial and human resource/payroll functions. The County's current architecture supporting these enterprise functions is fragmented, and the need to integrate systems is discussed widely, well documented, and understood by all levels of management. The solution needed for implementation, however, is not yet defined or agreed upon. This strategy speaks to the need to address the next round of systems migration in a logical and controlled manner.

Under the current scenario, the County processes the same business functions in two different ways. The systems used are not integrated, and different groups of employees support these separate systems through redundant processing, maintenance, and reporting efforts.

Moving to a single, unified platform will entail implementing one set of applications rather than working with the existing two. There are a few different alternatives that may be pursued to replace the current systems. The first is to reimplement one of the existing systems as the platform for the entire County. The second is to reimplement both of the existing systems in an integrated fashion so that they function effectively as a united platform for the entire County. The third is to start anew and implement a comprehensive system from another vendor. Best practices are to utilize one HR/Payroll system and only one Financial system. It is not necessary to move all operations to one single vendor package, as long as the systems are integrated.

Selecting an enterprise solution requires careful analysis to identify the optimal and most cost-effective solution. There are a handful of ERP systems positioned as leaders in the governmental marketplace that are suitable to meet the County's needs. Each package has trade-offs, and none will fit perfectly. The leading systems include Oracle, with 2000 public-sector installations; PeopleSoft, with 650 public-sector installations; and other alternatives like J.D. Edwards and SAP. The County has direct experience operating Oracle and PeopleSoft.

In considering the replacement process, serious consideration should be given to packages that County employees are already familiar with in terms of functionality. For this reason, Oracle and/or PeopleSoft appear to offer some distinct advantages in that they represent familiar technologies to some County agencies and staff. In the short term, these systems offer three key benefits: (1) shorter implementation time, (2) reduced need for training, and (3) increased report availability. Over the long term, familiar systems are apt to be more heavily utilized during the first several years, given the existing knowledge base throughout the County. These benefits will directly reduce the time and costs associated with implementation and ongoing systems utilization.

BUSINESS CASE

Implementing an enterprise system carries the promise of having information entered one time, into one common repository, so that it is available for use across the various functions of an organization. Enterprise systems provide multiple benefits, summarized below from a case study of Landec Foods[33]:

- Improved information exchange
- Reduced financial reporting cycles
- Ability to identify recovery costs for services provided
- Ensuring performance of supplier contracts for goods and services
- More accurate information
- Consolidated operations
- Better coordination and efficiencies

Other enterprise implementation success stories include Dell Computer and PHH Arval, a vehicle fleet leasing and management company. According to an article in *Darwin* magazine, "Putting Two and Two Together,"[34] these companies have been able to optimize resources, control expenses, cut costs, and increase productivity.

These representative examples point out the benefits that many are hoping to achieve with an ERP integration strategy. According to a January 2002 survey of 350 IT professionals conducted by InformationWeek/Morgan Stanley, consolidation and integration are common themes in today's business and IT world: "Fifty-five percent of companies are reducing the number of applications they're running … More than a third are switching to off-the-shelf applications and nearly 20% are rewriting the applications they have. Half of those surveyed are deploying or plan to deploy enterprise resource planning applications this year. Of those, more than 40% plan to increase the number of ERP applications they use."[35]

The enterprise business case supports moving forward with replacement of financial and HR/Payroll systems. This strategy specifically addresses one of the four deficiencies related to King County identified in Governing.com's Government Performance Project 2001, related to the County's failed ERP system implementation. The business case supporting implementation of one combined and integrated system is reasonably strong and is based on consideration of quantitative and qualitative factors, and the alternative's status as a long-term proposition. Financial payback is expected to be realized only if the County aggressively reinvents itself. This will be no easy task.

[33] "Landec Food Subsidiary Completes Implementation of Business System Realizing Improved Efficiencies," *PR Newswire* (Jan. 8, 2002).
[34] "Putting Two and Two Together," *Darwin* 2 (No. 1, January, 2002): 30—36.
[35] Steve Konicki, "With Applications, Less Is More," *InformationWeek* (February 4, 2002): 45.

Achieving payback is reliant on the following conditions:

- Agreeing upon one way of doing things — standardizing, streamlining, and simplifying processes
- Integrating currently disparate databases to provide timely and accurate reporting, thus positioning management to make better business decisions
- Operating and maintaining a standard architecture
- Building adjunct systems for query and reporting purposes
- Implementing successfully through strong project management
- Getting agency personnel to operate as a team
- Training employees on one set of technologies
- Ultimately reducing number of staff involved in core support

If the County is unable to substantially deliver on these factors, the timeline for payback will be pushed so far out as to be inconsequential. As is, payback will not likely be achieved until at least 10 years out. A detailed cost/benefit feasibility study should be conducted to validate these statements.

There are two ways the County could achieve financial payback in the shortest time frame. Both will be difficult to achieve and involve staff reductions. The first is through direct reorganization of personnel. The scenario may be achievable if the County reorganizes its financial, HR, and procurement functions. This scenario would be accomplished through centralization whereby one group would support the enterprise instead of many. The second is related to the first; by simplifying business practices and workflow, all end-users who utilize the systems stand to gain efficiencies through reduced efforts and streamlined workflow. Although process reengineering will be required to successfully implement any system, the process may be used to further reduce the number of staff around the enterprise through simplified business processes, requiring significantly less time and effort to process information. The difficulty in either scenario is significant. Staff are anticipated to resist the change in workflow.

The costs of implementation are expensive. The 2001 Dye Management Report estimated that a new ERP system would cost in the range of $40.9 million in capital costs. When costs are totaled for current pricing and additional resources are added for up-front workflow analysis, internal staffing, training, and maintenance, costs could total in the range of $55 to $60 million. The exact costs will be dependent on information requirements that need to be updated and agreed to, and the actual configuration implemented with reengineered processes. Costs are roughly estimated during this planning study, but will be more accurately calculated when a system is selected, a contract negotiated, and a detailed implementation plan is developed.

Related Technology Needs:	Related Business Goals/Objectives/ Directions/Opportunities:	Related Deficiencies:
• Data Management • Financial Systems • Human Resource/Payroll Systems • Legacy Systems • Improved Integration Between Systems • Upgrade and Replace Dated Systems	• Manage Data and Information • Implement Technology Initiatives • Improve Processes • Integrate and Establish Partnerships	• Significant time is spent reconciling data between the four systems. • Numerous additional stand-alone databases have been developed for tracking data that are not maintained in the separate systems • Departments report information differently depending on what system is used. • OHRM lacks ownership of the human resource data and has very limited confidence in its ability to produce accurate reports. • The current PeopleSoft system does not perform labor distribution at the level required. • Neither HR/Payroll system supports the desired payment cycle without significant reconfiguration. • Workarounds to overcome shortcomings in MSA have created inconsistent and inaccurate data. • Documentation for modifications to the systems is lacking.

Costs:			Payback:		
Low	Moderate	**High**	Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Simplify County workflow												
a. Identify and document current processes												
b. Define issues to be resolved												
c. Identify and analyze options												
d. Discuss/select new processes												
2. Upgrade current IBIS, PeopleSoft, and MSA versions (only as required in short term with negotiated price reductions)												
a. Install												
b. Convert data												
c. Reconfigure systems												
d. Test												
e. Train												
f. Go live												
3. Define detailed enterprise needs												
a. Define detailed requirements												
b. Discuss												
c. Document												
4. Conduct procurement process												
5. Select systems												
6. Implement (in phases)												

Costs	Year 1	Year 2	Year 3
Capital:	850,000	17,770,000	8,270,000
Operations:		100,000	2,400,000
Total:	850,000	17,870,000	10,670,000

Capital Costs: Associated with implementation through Year 4.
Operations Costs: Continue annually indefinitely.

OUTCOME MEASUREMENT

- Requirements defined and agreed to by agencies
- Reengineered business processes with changes implemented
- Successfully implemented integrated systems
- All employees using one type of software
- Satisfied end-users
- Lower total cost of ownership

D. Management and Organization

Five strategies have been developed to address the County's technology management and organization. The strategies specifically address accountability, planning, project management, reorganization, and training. Related to management and organization strategy development weaknesses of particular concern include lack of the following:

- Formal performance measurement, which hinders agencies from knowing where plans, initiatives, projects, and budgets stand during implementation and afterwards.
- Designs and plans to guide personnel in development, implementation, and deployment activities.
- Project management capabilities.
- Centralized, coordinated organization structure supporting enterprise functions and technologies.
- Leadership, analytical, and project management skills focusing on the "business side" of technology deployment.

D1. Institutionalize performance measurement for technology.

Timing: PHASE ONE	Difficulty: LOW
– Requires a new way of results-oriented thinking. – Will reshape resource allocation over time to directly achieve improved performance. – New function requires ongoing monitoring resources. – New framework implementation requires time to refine and influence planning. – Measurement system may intimidate agencies' personnel in short term until used to it.	

Performance measurement provides a direct means of knowing whether goals and objectives are being met through tracking and monitoring mechanisms. A tracking framework will directly tie County business strategies and goals to corresponding actions, and then measure the outcomes of such actions. As the County becomes more results oriented and particularly focused on stakeholder delivery, performance measurement will need to be defined for service delivery, operations, architecture, management and organization, and funding functions. A broad-based technology performance-measurement framework should be developed to help ensure that plans are carried out, and through time, ensure that proper plans are put into place.

Performance measures may be used to measure results from the top to the bottom of the organization. Such measures will track what progress is being achieved pertaining to King County's strategic plans. While drilling down into the agency's domain, performance measures will also track progress made toward implementing agency business plans and the associated technologies to support such plans. Related to specific projects, performance measures will provide a means to track whether specific technologies are deployed on time, on budget, and in a viable manner. The County has already begun establishing a performance measurement framework related to technology. This framework is discussed in the Appendix to this plan including both processes and the premises behind outcome measurement.

BUSINESS CASE

Unlike previous "measurement" tools used in the marketplace such as management by objectives (MBO), performance measurement is not going away. During the 1980s and 1990s citizen concern for public accountability became so strong that the federal government passed the Government Performance and Results Act in 1993, requiring federal agencies to document the outcomes and benefits of their services.[36] This effort has grown to include state and municipal governments. "Mayors, council members, general citizens, and municipal administrators want to know how to judge the service delivery performance of their local government." Cities cited as models for this process include Charlotte, North Carolina; Sunnyvale and Palo Alto, California; Phoenix, Arizona; Dayton, Ohio; and Dallas, Texas.[37]

The County is well positioned to benefit from institutionalizing performance measurement. The hard dollars associated with setup are minimal, and costs may generally be absorbed into everyday measurement and reporting activities. In contrast to the costs involved, the benefits are more significant. The driving premises behind using measurement systems are twofold. First, performance measurement systems prompt personnel to be more accountable and perform at higher levels than would otherwise occur if measurement systems were not in place. End users then benefit through higher quality systems and service delivery. Second, and just as important, when technology performance problems are occurring, they can be found and corrected right away.

A performance measurement framework should be developed immediately for use in 2003 and beyond. The hard costs associated with developing a framework are at most moderate. Time from County managers from the BMC/TMB is a requirement. A secondary cost will come in the form of a facilitative process should the County not be positioned to do this on its own. Benefits from deploying a framework will be achieved in the near term. Specific measurements may be obtained and used to make go/no-go decisions, determine whether resources have been effectively expended, redirect efforts as required, help prioritize initiatives, align with change management, and provide feedback into future planning decisions.

The return on implementing performance measurement is easy to see. As reported in "The Graziadio Business Report," workforce surveys indicate that people believe they could improve their own job performance by 15 to 20 percent but that no one would recognize the improvement. Such improvement could have a tremendous impact on productivity and cost savings. It is also predictable that systems and work processes could be improved through measurement tools. The performance gap between current staff and system productivity and potential productivity can be closed through measurement, tracking, recognition, involvement, and evaluation.[38] All of these activities are relevant to institutionalizing technology performance measurement and will serve the County well.

[36] J. Theurer, "Seven Pitfalls to Avoid When Establishing Performance Measures," *Public Management* (1998).
[37] D. N. Ammons, "Municipal Benchmarks: Assessing Local Performance and Establishing Community Standards," (1996).
[38] Charles D. Kerns, "Maximize Business Achievement," *The Graziadio Business Report* (2002).

Related Technology Needs:
- Proactive Service Delivery
- Help Desk Support
- End-User Training
- Service-Level Commitments
- Standards
- Strengthened Leadership and Management
- Staff Retention
- Agency Coordination

Related Business Goals/Objectives/ Directions/Opportunities:
- Improve/Expand Services
- Empower Employees
- Manage Data and Information
- Optimize Analysis, Assessment, and Improvement Practices
- Establish Communication and Collaboration
- Define Metrics and Performance Measures
- Strengthen Project Management
- Increase Revenues and Control Costs

Related Deficiencies:
- There is limited reporting available to track and measure performance.
- Business analysis is not performed across agencies where it could be used to promote cross-agency system efficiencies.
- Few service-level agreements exist across the country.
- ITS services have not always been available on a timely basis.

Costs:			Payback:		
Low	**Moderate**	**High**	**Low**	**Moderate**	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Define key operations and delivery areas requiring measures												
2. Define potential performance approach/metrics												
3. Develop performance metrics												
4. Align with business plans												
5. Select/Approve metrics												
6. Implement measurement process												

Costs	Year 1	Year 2	Year 3
Capital:	Costs will be absorbed internally.		
Operations:			
Total:			

OUTCOME MEASUREMENT

- Defined measures
- Use in annual planning efforts
- Corresponding changes occurring as a result of measurement
- Mechanism put into place to monitor progress, change activities
- Resource utilization/productivity
- Quality of service
- Customer responsiveness

D2. Develop technology design/plans for significant initiatives and projects.

Timing: PHASE ONE	Difficulty: LOW-MODERATE

- Must be defined as a mandatory County requirement in particular circumstances.
- Requires alignment with architecture.
- Significant projects require some coordination with enterprise initiatives.
- Limited resources available within County today to develop such plans (in terms of time and expertise).
- Planning has often been viewed as an unnecessary administrative function.

The purpose of the County's strategic technology plan is to provide direction to the various parties involved in developing and deploying technology. This plan does this through an established vision, defined strategies, and preliminary transition plans.

However, long-range directions at the County must align with day-to-day technology operations. Currently, this link between strategies and tactical activities is largely missing. While several current technology plans exist (Sheriff's Department [1/02], Transit [12/98], and Waste Water Treatment [1/02]), most agencies lack the detail that connects business plans to tactical actions and interagency initiatives. Consequently, there is little formal definition of technology at a project level, and a lack of prioritized actions, staffing assignments, and allocated funding. While agencies develop annual business and program budgets in due course, these budgets lack depth in terms of defined technology resource planning and allocation. More detail is required, especially in the areas of architectural design, resource deployment, and cost justification. Detailed technology designs/plans are needed in a number of technology areas at the County including the following:

- Broadband (including VoIP)
- Integration
- Web deployment
- Database architecture (including warehousing)
- Human Resources/Payroll implementation
- Financial system implementation
- Project/system upgrades (e.g., IBIS, MSA, and PeopleSoft, as required)
- Telephony (including voice-messaging integration)
- Workflow redesign
- Network security
- Law, Safety, and Justice system

The County should not proceed with any significant initiatives, projects, or major expenditures without proper plans in place. There will be a need to align this and future strategic technology plans with agency business plans on a continuous basis.

BUSINESS CASE

In the County's case, the lack of plans has meant two things. The first is a lack of progress. The County has been at a standstill on many initiatives and is now behind in delivery relative to many of its peers in areas such as Web integration and data management. Second, for technologies that have been deployed, the lack of plans has resulted in numerous ineffective systems. Systems suffering from a lack of front-end planning/design include Financials, Human Resources/Payroll, and Law, Safety, and Justice, to name a few.

Planning at the design and task levels will provide a much-needed blueprint to help guide those responsible for technology deployment. Without such plans, no firm costs or schedules are available. For major initiatives, systems, and/or projects, planning is considered to be an essential requirement before implementation begins. Without planning, the County's architecture is at risk of being assembled improperly and/or inefficiently. Required planning components include the following:

- Requirements
- Specifications
- Overall design
- Integration
- Schedules
- Resource allocation
- Assignments
- Budgets

Planning in each of the identified areas is expected to reap significant payback. Further, when individual plans are compared side by side, they may be prioritized in terms of resource allocation and deployment. Based upon Moss Adams's experience, solid project planning and design can save the County up to 20 percent of the time/resources required to build and deploy new technology. The cost of developing plans will vary widely, as each is dependent on different circumstances.

As Radha Pillai, of United Way of New York City, writes in regard to not-for-profit agencies, "Long-range and strategic planning are necessary for all agencies. Such planning enables agencies to prioritize and concentrate their efforts in order to reach their goals quickly and effectively. Unfortunately, many organizations fail to include technology as part of the planning process. The quality and efficiency of services provided by an agency often depend highly on the technological capacity of the organization."[39] This is true across virtually all organizations. There are a number of benefits to technology planning, including the following:

- Enabling effective and efficient use of technology: Enables planners to efficiently plan technology expenditures based on prioritized needs.
- Ensuring that the right components are purchased: Coordinates needs and helps to identify the correct hardware and software needs and prevents errant purchases.
- Reducing costs: Enables the organization to review and identify solutions that will meet the organization's needs at least cost.

[39] Radha Pillai, "Developing a Technology Plan: Key to Getting Needed Funds," *Tech News*.

- Guarding against crisis situations: Avoiding poor decisions through planning helps to prevent emergencies.
- Utilizing staff time optimally: Helps to optimize use of resources and streamlines staff use.
- Protecting against staff turnover: Protects the organization from instances of staff turnover by documenting needs and strategies as well as existing systems.
- Securing funding: Allows definition of need for funding, thereby increasing the likelihood that needed technologies/projects will be funded.

To achieve these benefits, an effective technology plan must be developed in stages. Each project is expected to have these components. The following steps indicate what, at a minimum, should be involved:

- Establish leadership and support: Attain leadership buy-in and establish a technology team.
- Assess the organization's systems: Determine what technology is in place, what is working, and what is not.
- Define organization's technology needs: Identify technology needs based on business drivers.
- Explore potential solution: Assess the "gap" between current systems and needs and then identify and review solutions.
- Develop technology plans: Document resources, identifying needs, solutions, and required funding.
- Pursue funding: Utilize technology plan as basis for needed funding.
- Implement the plan: After attaining funding and establishing a timeline and responsibilities, proceed with implementation of the plan.

In summary, the business case supporting the design/planning process is strong. Arguments may be made for requiring plans on all significant projects and designs for all major technologies and systems. Properly developed plans and designs are assumed to recover development costs directly through increases in personnel efficiency, enhanced resource allocation, and cost avoidance related to avoiding mistakes that would otherwise be made if proper planning efforts were not undertaken.

Related Technology Needs:
- Unattended Business Functions
- Standards
- Data Management
- Planning and Design
- Hardware Standards
- Upgrade and Replace Dated Systems
- Strengthened Leadership and Management

Related Business Goals/Objectives/ Directions/Opportunities:
- Improve/Expand Services
- Manage Data and Information
- Optimize Analysis, Assessment, and Improvement Practices
- Strengthen Project Management
- Reorganize and Restructure
- Improve Processes
- Utilize Planning Activities

Related Deficiencies:
- Both strategic and tactical plans are lacking.
- Staff are not well trained to conduct planning.
- CX agencies are the least likely to plan on a regular basis.
- There is no strategic framework in place for directing and unifying GIS efforts.
- The result of not planning has a threefold impact. First, when maintenance is needed, funds are not always available. Second, when costs are incurred, they are often higher than they should be. Third, computer assets are sometimes neglected.
- Occasionally technology was referenced within plans, but the analysis was usually limited.
- Overall, the linkage between available business and technology plans is lacking.
- There is a lack of strategic planning.
- There is no "Countywide" plan to address security.

Costs:			Payback:		
Low	**Moderate**	**High**	**Low**	**Moderate**	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Develop planning framework												
2. Obtain BMC/TMB support and buy off												
3. Identify and discuss needs for plans/designs												
4. Acquire/assign project managers												
5. Schedule activities/projects												
6. Conduct planning/designs (according to needs and alternatives analysis)												

Costs	Year 1	Year 2	Year 3
Capital:	Costs will be absorbed internally.		
Operations:			
Total:			

OUTCOME MEASUREMENT

- Planning framework developed for County and endorsed by agency directors
- Plans used as a roadmap to guide efforts, projects, implementations, etc.
- Planning guidelines
- Priority listing of plans to be developed
- Schedule for development of plans
- Number of plans created
- Update/review schedule established

D3. Establish a comprehensive project management methodology.

Timing: PHASE ONE	Difficulty: MODERATE

– The easy part of developing a program will be defining methodologies.

– Additional expertise will need to come from outside the County; otherwise, project management expertise will take time to learn.

– Not all interested personnel will be a good match with their skills.

– The pool of managers available today is less than needed for the pending workload.

Strong project management requires leadership and structure to ensure that a successful outcome is achieved. With strong project management, the County can position itself to deliver on commitments and properly execute plans. The County currently lacks extensive resources to support strong project management; specifically training, methodologies, and, most important, highly experienced managers are in short supply. Without strong project management, the likelihood of implementation difficulties increases as does the potential for project failure. This is especially true for very large or complex projects. Project management should be recognized as particularly important as the County gears up to deal with new major technology initiatives.

A fundamental component of the County's project-management program includes the already established Project Review Board (PRB). The role the PRB provides is one of quality assurance through review of new and in-progress projects at predefined milestones where key outcomes are expected. The Board's activities are structured to directly influence how project management is conducted within the County. When the reporting process is followed, it will naturally increase accountability. Progress reports are expected to be provided by the sponsoring agency's director, and potentially from the project management team. Milestone reporting will ultimately provide the County with the ability to redirect a project if it is required. The Board's work is considered vital to the future of the County's overall project-management program, and as such, should be expanded to monitor progress on all major projects.

One of the key benefits provided by the PRB process is to force development of needed plans and designs and to identify needed resources. The process provides an initial framework for project managers to follow for any sizeable project. For project-management purposes, the process may be used as a foundation to anchor early planning as well as providing a path to follow to keep project(s) on track.

The responsibilities of project management remain, appropriately, with those who are in charge on a daily basis. Currently, project managers are assigned throughout the County to manage a continuous stream of development and implementation activities. While managers are providing basic levels of direction, the processes followed often lack the structure necessary to ensure consistently high levels of performance. As part of a project, managers typically define tasks, schedules, budgets, and deliverables. These components are at the core of any program. However, the County is missing an extended tool kit that will advance the state of the County's project management program. Specific components of such a tool kit include processes for the following:

- Continuous executive management sponsorship and involvement
- Problem resolution
- Intra-agency oversight, review, and reporting (with go/no-go milestones)
- Involvement of end-users throughout the project
- Ongoing risk assessment
- Standard methodology

Strengthening project management will be a comprehensive endeavor. The process will consume multiple years and touch every agency. To strengthen capabilities, a multifaceted program is required. Near term, the County should focus on establishing new methodologies along with providing training to personnel. Essential elements in any methodology will include regular communications, active stakeholder involvement, ongoing analysis, and multilevel reporting. The associated training curriculum should focus on fundamentals. As required, training should be supplemented with coaching. Long term, the County should build up a critical mass of project managers, providing seasoned talent to share across agency boundaries. ITS should establish a pool of managers to support their own and other agencies' projects. Larger agencies may also desire to establish their own project management capabilities. For the largest of projects, a team of managers may be appropriate in order to deal with the many facets of governance, sponsorship, and technical oversight.

BUSINESS CASE

There should be little debate as to the need for strengthened project management. With an anticipated $50-$100 million in projects underway and pending, a solid program will be needed to optimize the County's investments in technology. The benefits of a project-management program are directly tied to increasing the potential of success. Project management will increase the likelihood of projects being completed on time, on budget, and achieving the intended outcomes. The benefits of management will directly improve financial performance, and also help ensure that those projects with planned financial payback are able to deliver on that promise. The costs of implementing a strengthened project-management program are tied primarily to training and the time involved to execute the program.

According to a white paper written by Steve Crago of the University of Southern California's Information Sciences Institute, "A project is defined as a temporary endeavor undertaken to create a unique service." In this endeavor, project management involves balancing competing demands among scope, time, cost and quality; stakeholders with differing needs and expectations; and identified requirements (needs) and unidentified requirements (expectations).[40] According to Standish Group, a consulting firm in West Yarmouth, Massachusetts, "28% of all IT projects are cancelled before completion, and an additional 46% are behind schedule or over budget."[41] Analysis indicates that the primary reason for failure of the projects was poor or insufficient project management.

An example of a recent success in project management may be seen at the R. R. Donnelly & Sons Co. in Chicago, which recently migrated its 18,000 worldwide e-mail users onto a single e-mail system. The migration replaced eight major e-mail systems and included new hardware, new network architecture, and newly centralized e-mail management. Despite hitting the usual unforeseen obstacles and detours, the e-mail migration project was completed six months early and under budget. Gary Sutula, Donnelly's CIO, defined the critical factors involved for keeping the project on track:

- Personnel — The right people, whether internal or external. Personnel must have the right skills and expertise required for the particular project.
- Plans — Project plans, including schedules, tasks, and responsibilities, and budgets with each project team member accountable for their specific issues.
- Results — Project focus on the overall organization, not on departments or individuals. Success depended on cooperation from throughout the group, regardless of potential political resistance.

Clearly, project management is often the differentiating factor between those projects that successfully improve technology in a cost-effective manner and those that either fail to improve systems or do so at unforeseen and politically damaging costs. The benefits of project management are worth the effort. Implementing a solid project-management scheme properly will require an upfront investment in training and tools so that project managers can approach the task in an effective and consistent manner.

Related Technology Needs:	**Related Business Goals/Objectives/ Directions/Opportunities:**	**Related Deficiencies:**
• Unattended Business Functions • Standards • Planning and Design • Strengthened Leadership and Management	• Improve/Expand Services • Empower Employees • Establish Communication and Collaboration • Define Metrics and Performance Measures • Strengthen Project Management • Increase Revenues and Control Costs	• An advanced project management framework is not in place; standards are lacking. • Project management and analytical skills are lacking. • Agency groups lack coordination. • Both strategic and tactical plans are lacking.

[40] Steve Crago Ph.D., "Management by Projects," University of Southern California, Information Sciences Institute-East (August 17, 2000).

[41] *Information Week Magazine,* data excerpted from "The Chaos Report," produced by the Standish Group (November 30, 1998).

Costs:			Payback:		
Low	Moderate	High	Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Develop project management methodology												
2. Define basic requirements for managers												
3. Obtain buyoff from BMC/TMB												
4. Develop training program and deliver												
5. Deploy new project-management framework												

Costs	Year 1	Year 2	Year 3
Capital:	150,000		
Operations:			
Total:	150,000		

Capital Costs: Associated with developing a methodology.

OUTCOME MEASUREMENT

- Definition of project-management approach and methodology
- Plans in place before projects begin
- Number of successful projects completed on time and on budget
- Adherence to agreed upon approach
- Scaling of methodologies to the size, scope, and complexity of the project
- Number of projects delivering predefined deliverables and results

D4. Reorganize technology functions around the County.

Timing: PHASE THREE	Difficulty: HIGH

– Significant process change is required.
– Management shake-up may be inevitable.
– Some potential financial impact may occur short term.
– There is risk of temporary chaos without strong management.
– Cultural resistance is expected.
– Uncertainty, confusion, and frustration may be anticipated near term if staff realignment occurs.

Currently, the County operates several technology groups located in various agencies. These groups are operating within ITS, DNR, Public Health, Transportation, and Finance, among others. The organizations have evolved over many years' time in parallel to specific agencies' business models. The groups have little coordination between them and, as such, perform redundant functions including programming, report development, network and server administration, and applications support.

There is some opportunity available to strengthen coordination between these groups. One of the most direct ways is through a reorganization process. The overall goal of this strategy is to operate more efficiently. This goal may be accomplished through more centralized management and control, which in turn will strengthen planning and resource allocation. The concept behind reorganization is to move the County more toward a centralized business model. This means that some functions that are currently

decentralized will move out from under individual agency oversight into a more centralized structure where the above-mentioned benefits may be realized.

At a minimum, arguments may be made for centralizing enterprise functions, some of which are handled by decentralized agency IT groups. This means that telephony, wide area network, data resource management, asset management, Web services, local area networks, desktop support, and HR/Payroll and Financial applications would be managed under one central responsible authority. Presently, such functions are managed in a hybrid manner, with some administration occurring centrally and some decentrally in agency-controlled environments.

This strategy does not suggest that agencies are performing poorly in these areas. Rather, it recognizes the potential for increased synergy of these efforts if County managers work together to allocate resources in a more coordinated fashion. As it stands now, individual agencies are not positioned to share resources or manage in such a manner to move resources around on an enterprise scale and against a backdrop of 10,000 end-users. Reorganization holds the promise of enabling the necessary resource sharing as well as the possibility of eliminating duplication and overlapping efforts. Table 41 identifies how enterprise functions are currently being managed.

Table 41: Current Split of Enterprise Technology Functions

Function	Centralized	Decentralized
Telecommunications	Enterprise (PBX, Centrex)	Switches, routers, PBXs, handsets
Voice Messaging	Enterprise	Not applicable
E-mail	Enterprise	Not applicable
Network	WAN/I-NET/LANs	LANs/desktop support
Facilities	Central data center	Multiple data centers
Financial – HR/Payroll Systems	Shared functions	Shared functions
Help Desk/Support	Enterprise help desk	Agency help desks/desktop support

To support the proposed reorganization, formal ties between agency managers will need to be strengthened to increase the quality and speed of technology delivered to end-users. Stronger ties should come in the form of managerial alignment, plans, defined group responsibilities, and ongoing coordination, communications, and progress reporting. A skills inventory related to identifying both managerial and staff capabilities will support this process. Further, outsourcing should also be assessed during the reorganization process. Potential opportunities that should be examined for outsourcing including the help desk, applications support, development, data center, PC maintenance, and network management functions.

The process of reorganization will impact ITS and all other agencies with established technology functions. In total, up to roughly 300 personnel could be affected, including some possible staff reductions. How the reorganization actually occurs will depend upon needs and assigned reporting relationships.

The end result of reorganization will be a newly reconstituted central services department. This department will be an expanded version of what exists today at ITS. In concept, agencies' staff involved in enterprise functions would transfer to the new central services department. This is not to say that any physical moves will be necessary. Rather, changes will be made through modified reporting relationships, assigned responsibilities, number and location of end-users served, specialization, and team service delivery.

It must be recognized that numerous agency functions may be best left in decentralized agency environments. Key among these is specialized application support. An example of the need for specialization is found in Transit's Management Information and Transit Technology Group. To maintain current high levels of responsiveness and connections with end-users, strong arguments may be made to leave such application groups intact and managed as they are presently.

A final alignment at the top of the organization is also in order. The CIO function has already been structured to provide leadership at the County. As such, the CIO's efforts should focus on strategy development, establishing policy, and leading governance efforts at the Council, Executive, SAC, and BMC levels. The day-to-day leadership and management should appropriately be left to the manager in charge of the various technology groups remaining within the agencies. As part of this alignment, the CIO position could be moved out from OIRM and a separate OIRM Director assigned. This move will reinforce the CIO's position as a leader over all technology groups at the County. A separate office for the CIO may be established. Meanwhile, OIRM should continue its efforts in providing oversight, analysis, and planning. The OIRM, CIO, and newly reconfigured central services department could be colocated to capitalize on further synergies that may develop. Lastly ITS should be renamed if the reorganization takes place, to obtain a fresh start.

BUSINESS CASE

Summary benefits of reorganization will provide advantages in terms of efficiency and effectiveness. From an efficiency standpoint, fewer resources may be needed Countywide. From an effectiveness standpoint, technology will be deployed, operated, maintained, and serviced at a higher level of performance because of tighter coordination between personnel, planning efforts, aligned schedules, and strengthened resource allocation. One of the primary intents of reorganization will be to reduce IT management costs across the County. This is an attainable goal for technology staff supporting Countywide functions should the County aggressively pursue reorganization. In a reorganization, the bottom-line benefit will be a more effective business model — strengthening alignment of the County's technology investments to meet both citizen and intra-County business needs.

The business case supporting this strategy is dependent on reorganizing technology positions. There are approximately 178 staff in ITS, and outside of ITS another 150 staff operate to support technology. The currently established organizations have promoted some redundancies and inefficiencies in their technology operations, and many functions are expected to be better managed through a reorganization. These include the help desk, Web development, training, data management, applications support, integration services, and business analysis. By maximizing efficiency and minimizing overlap, it is estimated that centralization may reduce/reallocate a number of these personnel Countywide. It is worth noting that decentralized operators may be reluctant to give up their autonomy. Arguments supporting the status quo are usually tied to the need for flexibility, increased responsiveness, and ability to meet their unique needs.

Reorganization may also improve responsiveness by balancing on-call staff levels to ensure continuous support. Continuous support is a challenge for smaller agencies with limited budgets. Grouping staff will result in a pooling of knowledge that increases the likelihood of an immediately successful response. Grouping staff who share common service areas may also increase their collective knowledge through increased peer communications, training, and mentoring. Direct benefits of this approach include the following:

- Reduced function redundancy
- Improved retention and recruitment
- Consistent distribution of desktop technology, enabling better enterprise support
- 24x7 support being easier to provide (e.g., to smaller agencies)
- Faster problem solving
- Increased potential career planning and opportunities
- Knowledge transfer between personnel
- Increased training opportunities
- Improved standard setting (e.g., Win 2000 implementation because of Active Directory and Messaging functions)
- Improved license management for broadly used products (e.g., Oracle, Microsoft, antivirus software)

In industry, reorganization through centralization has enabled many organizations to realize the same benefits, including lower budgets, reduced attrition, and improved quality of service. For example —

- The state governments of New Jersey, South Carolina, Pennsylvania, and Missouri have all recently undertaken substantial consolidation projects that have considerably simplified management of those governments' data. Pointing out cost savings as well as staff retention issues, these states are seeking to eliminate redundant data and operations centers. "The effect of consolidation can be significant. Most governments are projecting multimillion-dollar savings, greater operating efficiency, more opportunities to launch new IT projects, and, in some cases, a centralization of independent applications."[42]

[42] http://www.govtech.net/magazine/gt/1999/jan/datacenter/datacenter.phtml

- United Space Alliance of Houston, prime contractor for NASA, was able to consolidate operations that led to a staff reduction of 17 percent. Most of these savings were realized by reducing the number of help desks and avoiding redundancy of duties; providing network support from one or two central locations also allowed for greater knowledge sharing and reduced troubleshooting times.
- Limited Technology Services, an IT business supporting the retail industry, realized the benefits of consolidation through a more structured, leaner, and more organized department, resulting in a cut of attrition rates by 50 percent. The centralized business model resulted in clearly defined roles and responsibilities of staff, eliminating the costly and inefficient "jack of all trades" positions that existed in smaller offices.
- Consolidated Natural Gas (CNG) established a more centralized structure that ensured a successful conversion to SAP since the implementation of the package in a decentralized model would have significantly increased the risk and expected costs. Simply put, CNG believes the existence of a single technology department with responsibility over the technology was the only way for such a large-scale ERP implementation to be brought to its successful conclusion.[43]

The summary arguments supporting reorganization through centralization are numerous. Centralization promotes standardization, which is often the most cost-effective way to run the business; requires one set of resources — not many; provides for synergies and economies of scale among the shared set of users; often provides a simpler environment to manage; and may directly save costs through efficiencies attained and described above. However, centralization also has some disadvantages. Chief among these are a "one-size-fits-all" mentality, whereby unique agency requirements may not be met; potential for increased bureaucracy and sometimes too much control versus a needed "close-to-the user" customer service mentality; and a lack of a strong track record for reliably delivered services at central sites.

While the costs of consolidation are short term, expenditures supporting the move may be significant. Reorganization may cost the County significant money depending on whether personnel are shifted. Regardless, the net benefits of a reorganization are assumed to be positive, particularly if cost cutting is part of the effort.

[43] *CIO Magazine* (September 15, 2001). Available online at http://www.cio.com/archive/091501/centralization.html

Related Technology Needs:
- Unattended Business Functions
- Standards
- Data Management
- Planning and Design
- Document Management

Related Business Goals/Objectives/ Directions/Opportunities:
- Manage Data and Information
- Improve Processes
- Increase Revenues and Control Costs
- Reorganize and Restructure
- Utilize Cost-Reducing Technologies

Related Deficiencies:
- There is a lack of enterprisewide coordination.
- Focus has been on maintaining status quo.
- Staffing levels appear stretched.
- Agency groups lack coordination.
- Some agencies are frustrated and resisting the new level of oversight.
- Because agencies have evolved independently, there is some overlap in services being provided.
- Very little top-down planning has occurred within the County to establish an optimum organizational model balancing what is delivered centrally and decentrally.

Costs:			Payback:		
Low	**Moderate**	High	Low	**Moderate**	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Inventory technology personnel skills												
2. Assess skills												
3. Meet with agency executive management												
4. Build consensus/support for change												
5. Identify alternative organizational structures												
6. Conduct alternative cost/benefit analysis												
7. Select/agree to a structure/announce												
8. Develop new position descriptions/SOPs as required												
9. Develop a detailed physical consolidation plan (as required)												
10. Reorganize County IT/conduct change management process												

Costs	Year 1	Year 2	Year 3
Capital:	500,000		
Operations:			
Total:	500,000		

Capital Costs: Associated with an organizational study.

OUTCOME MEASUREMENT

- Skills inventory
- Cost/Benefit analysis
- Selected new structure
- Improved managerial alignment and communication
- Productivity levels
- Cost of operations

D5. Strengthen technology management and delivery capabilities through specialized training.

Timing: PHASE ONE	Difficulty: MODERATE-HIGH

– This is a multiyear process, especially if focused on training current personnel (rather than hiring).

– Some business skills are challenging to teach/attain.

– Funding is required.

– Requires clear understanding of individual weaknesses and targeting training/coaching to address.

During the strategic planning study it became apparent that County technology personnel lack skills in several key areas including leadership, analysis, and project management. While many personnel have strong technical skills, they lack expertise related to "managing" technology particularly in the area of change management. The three areas of leadership, analysis, and project management are especially important for the County to successfully work through its transition process.

The first area of need pertains to leadership. Throughout the 1990s technology leadership within the County has not kept pace with the needs of the $2 billion, 15,000-person organization. The leadership issue came to a head with the partial failure of the ERP implementation in 1999. Since that time a fair amount of change has occurred, including (1) hiring of a new Chief Information Officer (CIO), (2) establishment of the Office of Information Resource Management (OIRM), (3) development of a new governance process, and (4) hiring of multiple new technology managers within the agencies. Through this process technology leadership has begun to change from the top down, but however solid the structure may be at the top, the recent changes in leadership are not enough to spur change throughout the whole organization. The change in leadership needs to continue. At this point, attention should be directed to those who are managing agencies' technology units down to the supervisor level. Training will be instrumental to continuing the change process. Needs-driven leadership training will address (1) staying focused on the business; (2) influencing peers, direct reports, and other employees; (3) managing change toward best practices; (4) developing and managing against budgets; (5) decision making related to outsourcing; (6) enhancing vendor selection and management; (7) building a technical team; (8) measuring performance; (9) managing for quality; (10) balancing enterprise vs. agency needs; (11) utilizing virtual teams; (12) facilitating team-based decision making; (13) managing customer expectations; and (14) communicating effectively.

The second area of need relates to analysis. The assessment portion of this study recognized that personnel tend to know their jobs well technically, particularly related to daily systems operations. These same personnel, however, often do not have extensive training in business analysis, leaving the organization rich in technical know-how, but lacking in knowledge of when and how best to use it. Important business decisions are being made daily related to technology. Examples include vendor and product selection, systems design, and application prioritization. However, while current systems are kept operational, the challenging "big picture" business issues related to technology often go unnoticed and/or unresolved. Further, the same individuals who are chartered with maintaining systems are also responsible for making critical cost/benefit decisions that will impact agency efforts for years to come. Business analysis skills are needed within agencies down to the lead level. Analytical training will include how to (1) gather, assess, and document requirements; (2) perform feasibility analysis; (3) conduct risk assessments; (4) evaluate alternatives; (5) apply various decision-making techniques; (6) survey for critical issues; (7) phase development and implementation; and (8) construct cost-effective architecture.

The last area of need pertains to project management. There are dozens of active projects at the County being worked on at any given time. The projects are important to the County in terms of the business needs. Particularly challenging are projects that are implementing a change to Web-based architecture, which in turn demands a fundamental change in business processes. For any project manager facing this double challenge of implementing new technologies while at the same time managing change to core business processes, the effort is significant. Because many project managers' skills require improvement, the County should establish a program that supports the managers through selected training and, if necessary, ongoing coaching. This training should be aligned with the effort to strengthen the overall project-management program at the County. Project manager training should include (1) how to transform project objectives into a work plan; (2) project scheduling, including critical path; (3) estimating workloads; (4) defining elements of project control and reporting; (5) managing against milestones; (6) how to assess risk; (7) how to deal with stakeholders including sponsors, quality assurance personnel, and end-user communities; (8) defining scope and addressing potential scope changes; (9) dealing with uncertainties and problems; (10) integrating comprehensive components; and (11) conditions that must be met prior to project closure.

BUSINESS CASE

The need at the County to acquire strengthened skills cannot be overstated. Successful projects require advances in leadership, analysis, and project management. Related to leadership, *Computerworld* reports, "… we've found that most of the ingredients for effective leadership today are virtually identical to those that have existed for decades. Leadership today isn't different; it's simply more important than before, particularly in IT organizations." To be effective, "IT leaders must be able to think strategically and technically — defining and articulating to others their department's relevance to their company's missions. They must also be able to act collaboratively, as opposed to autocratically, in order to garner the support of other executives." Furthermore, "IT

leaders also must be held accountable and be measured on factors such as employee morale, customer satisfaction, employee turnover and cost containment."[44]

The benefits of strengthened skills will have a significant impact on the organization. Skill enhancement will impact everything from technology planning to execution. The anticipated results of strengthened skills include improved decision-making capabilities and ultimately increased system performance. Whether it be related to budgeting, systems design, planning, deployment, or project management, skills enhancement will directly impact the County's ability to deliver technology on time and on budget.

Sufficient resources are critical to the success of implementing technology plans and managing technology infrastructure. Lack of these components has been directly linked to technology project failure. According to a 2000 Tech Republic study, approximately 40 percent of technology projects fail. Reasons for project failure included a direct lack of skills in project management and analysis. Two additional reasons were poor project definition and specifications and an inability to manage competing priorities.[45] The planned training will address these issues directly.

Successful organizations require strong staff with the appropriate analytical and project management skill sets. The right skill sets can be attained through the hiring of new staff, or training and retaining current staff. Linda Pittenger, vice president and managing director of IT consulting at the Hay Group, says that "training is a top retention vehicle, and career development is the No. 1 stay item for workers." In addition, "…organizations that skimp on training may pay for it in the long run." In short, companies that retool existing staff are retaining valuable people for future projects as well as attracting new workers.[46] Training in the areas of project management, business analysis, and leadership will have considerable long-term impacts on both retention and the success rates of the County's technology staff.

Costs for strengthening skills are mostly training related. The most significant factor that influences the ability to strengthen skills, however, is time. Even though training may be obtained, skills will be further honed over time. Training will require both classroom and ongoing coaching. Costs for training will be tied to time allocated and whether outside resources are required to supplement instruction.

[44] Dan Cohen and Gerry Plvermacher, "Making a Case for Today's IT Leaders," *Computerworld* (March 5, 2001) [electronic journal]. Available at http://www.computerworld.com/cwi/story/0,1199,NAV47_STO58256,00.html

[45] Bob Shipmen, "The Telecommunications Program Management Office (PMO): A Vehicle to Gain Project Control and Business Alignment," Sentix, LLC with C.C. Pace Systems, Inc. [white paper].
Available at http://www.ccpace.com/resources/theTelecommunicationsProgramManagementOffice.pdf

[46] Tim Ouellette, "…and Cut Worker Training Benefits," *Computerworld*. (March 30, 1998). [electronic journal]. Available at http://www.computerworld.com/cwi/story/0,1199,NAV47_STO30301,00.html

Related Technology Needs:
- Strengthened Leadership and Management
- Technician Training
- Staff Retention

Related Business Goals/Objectives/ Directions/Opportunities:
- Empower Employees
- Optimize Analysis, Assessment, and Improvement Practices
- Strengthen Project Management
- Enhance Skills

Related Deficiencies:
- Training is managed tactically versus strategically.
- There is limited cross-training between agencies.
- Limited formal funding is provided.
- Employees are often on their own to find help.
- An advanced project-management framework is not in place; standards are lacking.
- Staff are not well trained to conduct planning.
- Business analysis and modeling is not occurring at sufficient levels to adequately support decision-making processes.
- Formal training has not been obtained.

Costs:		
Low	**Moderate**	High

Payback:		
Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Define needs												
2. Inventory personnel skills, including management												
3. Evaluate skill "gap"												
4. Determine need for targeted training/coaching												
5. Obtain/deliver training												
6. Obtain/deliver coaching (as necessary)												

Costs	Year 1	Year 2	Year 3
Capital:			
Operations:	781,250	781,250	556,250
Total:	781,250	781,250	556,250

Capital Costs: N/A.

Operations Costs: Associated with training in Years 1 to 3.

OUTCOME MEASUREMENT

- Capabilities to handle high volume of work/issues
- Better decision making reflected through improved systems performance
- Less need for outside consultants
- Number of business training courses available/attended
- Managerial positions filled with experienced personnel
- Return on investment
- Staff satisfaction surveys and evaluations
- Staff skills
- Project success rate